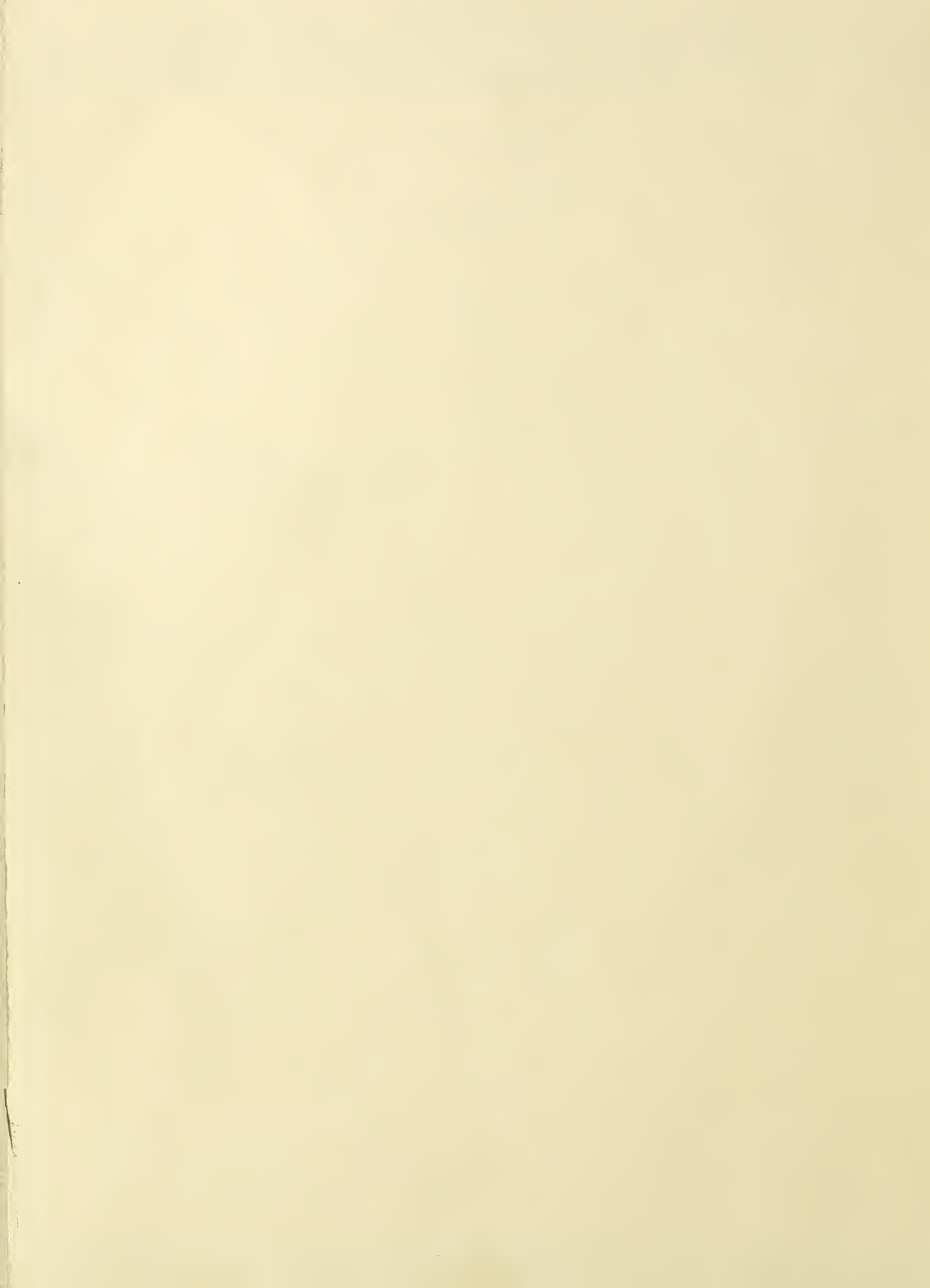


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BETTER FRUIT

VOLUME XIV

SEPTEMBER, 1919

NUMBER 3

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Features: {
 "Factors that Influence Diseases of Apples in Storage"
 "Specific Results in Pollinating the Bartlett Pear"
 "Packing Out the 1919 Apple Crop"
 "Dehydration as a Factor in the Fruit World"

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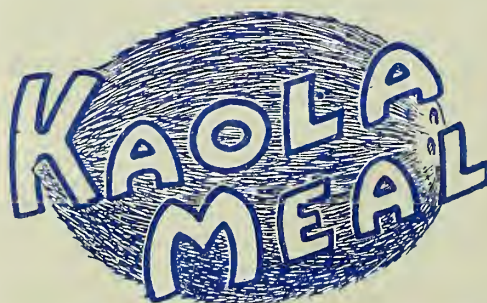
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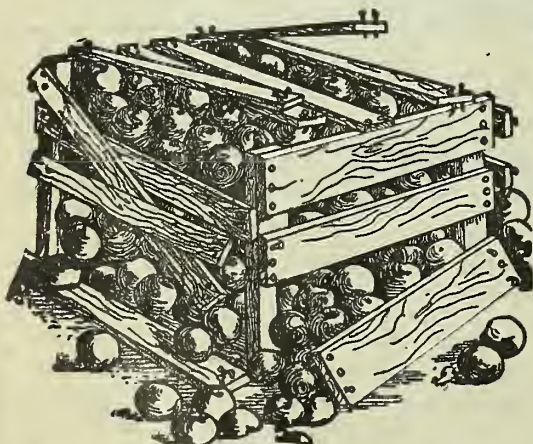
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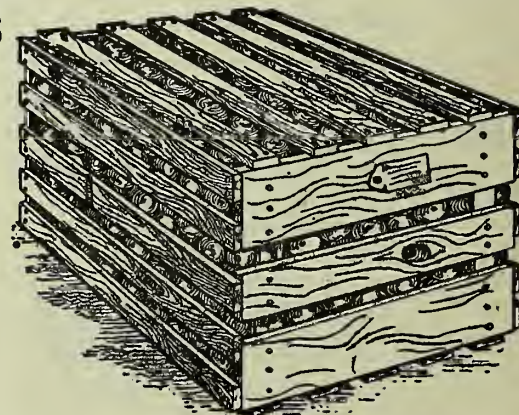
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NUMBER 3

Factors that Influence Diseases of Apples in Storage

By D. F. Fisher, Assistant Pathologist, Fruit Disease Investigations, U. S. Department of Agriculture

[EDITOR'S NOTE.—This article is not a technical discussion of this subject for the professional horticulturist. On the contrary, it is full of valuable practical information for the orchardist, the apple packer, the cold storage man and everyone else who handles apples from orchard to market.]

THE factors that influence diseases of apples in storage are of vital importance to all apple growers, as well as shippers and dealers, but too often the grower feels that his connection with the crop ends with its delivery to the shipper, and especially is this true if he receives cash payment upon delivery. If he sells early, delivering the apples direct from the orchard to the shipper, his connection with the later condition of the fruit is frequently questioned. He feels that thereafter the

risk is all the shipper's or the dealer's, both financial and as to the future condition of the fruit itself. In what manner, then, can the grower be affected if his fruit fails to "hold up" in storage—if his apples develop storage diseases? This question must be satisfactorily answered if the team work is to be secured in the fruit industry which will secure it on that broad basis fundamental to its continued success. To fully answer it the grower must project himself beyond the confines of his own orchard, the dealer must see beyond his own warehouse, each must obtain a concept of the industry as a whole. Each must understand that his own business stands or falls with that of the industry.

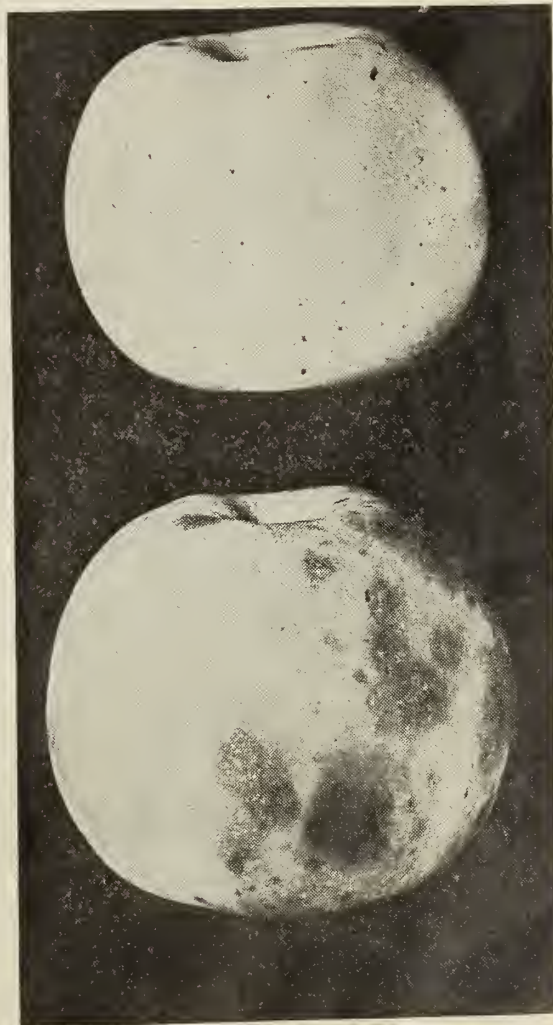
Here in the Northwest it has been possible to adopt the motto, "All for one, and one for all"—but, unfortunately, of late there has been a tendency to replace this with one reading, "Each one for himself, and the devil take the rest." There is a growing confusion of "quantity" and "quality," with too much emphasis on the "quantity" which the rapidly growing orchards have yielded and at the expense of the "quality" which it is essential that the Northwestern apple maintain in order to successfully compete in the great consuming markets of the East. Profitable disposition of Northwestern apples in Eastern markets is handicapped; first, by the high cost of production at home; second, by high cost of transportation to reach these markets; and third, by a constantly increasing competition with carefully selected Eastern apples, produced and marketed at less cost. The latter factor may not be a popular subject for discussion in the Northwest, but nevertheless an ostrich attitude does not pay, and the Northwest might as well realize that the East by no manner produces all culls and pie apples. If Northwestern apples must compete with Eastern apples in Eastern markets they can succeed only if they possess a quality upon which the trade will pay a premium. This has been the basis of the success of the Northwestern apple industry in the past, and it must continue to be so, for the other economic factors are inherently of advantage to the East.

Since "quality" necessarily becomes the foundation of the Northwestern apple business, it is the purpose of this paper to discuss certain influences affecting the quality of apples, that is, how quality is affected by storage diseases. The "quality" of an apple is subject to many influences in the realm of botanical science, and a number of technical investigations have been concerned with the subject, the results of which have not been generally disseminated. Some of these investigations have been conducted in the Northwest on Northwestern apples, but the principles deduced are of general application.

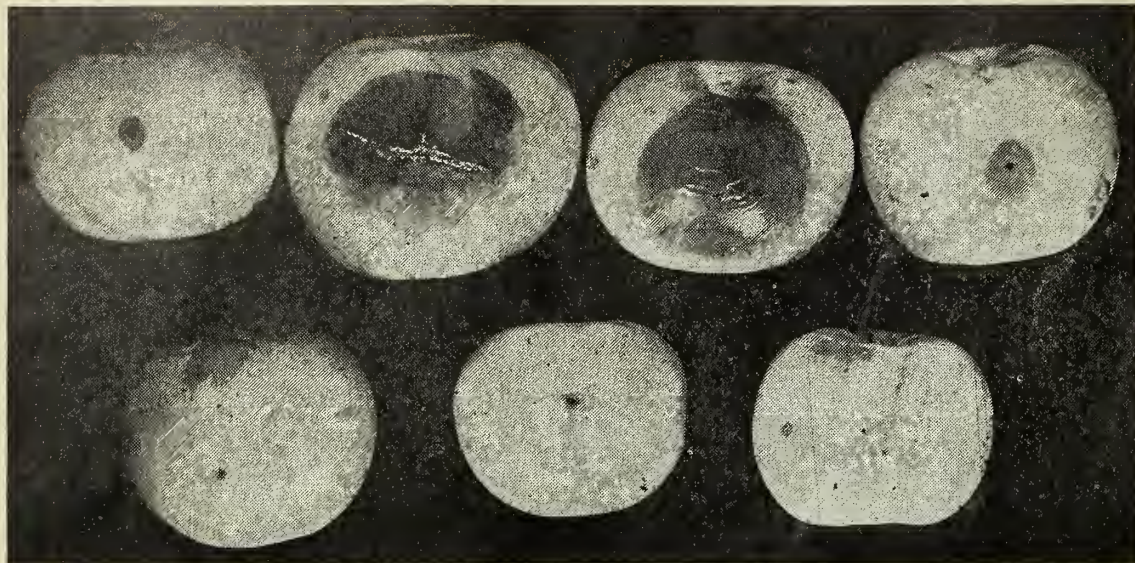
The quality of an apple cannot be



Types of soft scald on Delicious apples which were unpacked at Dryden, Washington.



Unscaled Grimes apple at top; scalded at bottom. A disease that is developed by improper storage methods.



Rots starting from mechanical injuries, such as bruises and slight punctures. This type of damage can be eliminated almost entirely by careful handling.

truly judged until it is eaten—and whether it be fit to eat early or late in its season is dependent upon its “keeping quality.” Consider, then, some of the factors that influence the keeping quality of apples—factors that produce storage diseases. There are two general divisions of storage diseases:

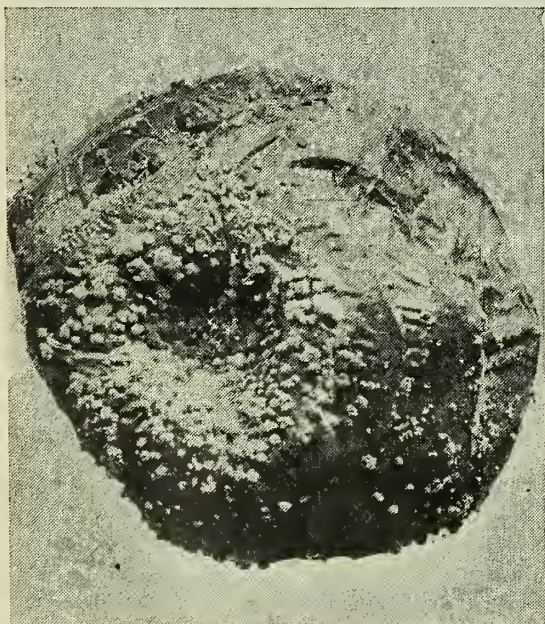
1. Parasitic, or those caused by such organisms as bacteria and fungi, or molds.

2. Non-parasitic, or the so-called “physiological diseases.”

Those in the latter class are frequently not regarded as diseases, but as “conditions,” but call them what you will, they cause pathological abnormalities.

Parasitic Diseases.

The parasitic diseases may be classified into two general groups: (1) Those which may be prevented by spraying and good orchard sanitation, and (2) Those which may be prevented by proper handling of the fruit. As an example of the first class we have the Northwestern anthracnose. This disease is confined to the Pacific Northwest and is most serious west of the Cascades. It is present to some extent in the White Salmon Valley, and it has



Penicilium, known better as “blue mold” rot, a fungous disease that develops in storage. Careful handling is recommended to reduce this trouble to the minimum.

been serious in the Hood River Valley, but it does not exist, so far as known, in any of the major apple districts of the State of Washington. This disease is caused by the fungus *Neofabraea Malicorticis*, which lives over from year to year in cankers on the branches. Its spores are matured in midsummer, but they require moisture for germination, and hence the disease does not spread before the fall rains. These rains usually begin before the apples are picked, and the fruit therefore may be infected before it leaves the tree. The spores may germinate and cause an early rotting of the fruit, but hard, late-season apples are usually not attacked until after they are in storage and have begun to soften. However, if the skin happens to be broken the fungus may secure immediate entrance and rotting proceeds at once. Fruit infection is prevented by spraying with bordeaux mixture before the apples are picked, but to control the limb cankers later applications are necessary.

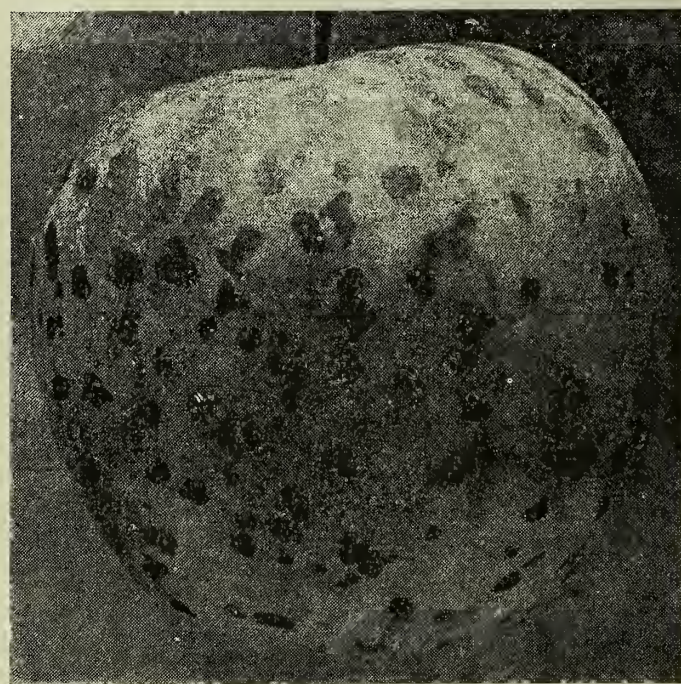
Apple scab is another fungous disease of importance in some localities of the Northwest, but fortunately is not prevalent in the great apple-producing districts of the State of Washington. The fungus usually produces its scab spots before harvest, but infected apples of course are not sold in the general trade. But late matured spores may lodge on sound fruit and infect the apples after they are picked and stored. Scab injury is superficial and affects the appearance rather than the eating quality of the fruit. But scab is frequently a vital factor in the keeping quality of apples, for various other fungi, in themselves incapable of penetrating the sound skin of the fruit, gain easy access through the scab spots and cause the fruit to rot. From this standpoint alone the exclusion of scabby fruit from the higher

grades is justified. The prevention of scab is accomplished by good orchard sanitation, accompanied by fungicidal spraying at such intervals as to protect the fruit from bud to harvest.

The parasitic diseases of apples in storage that can be prevented by proper handling of the fruit are those due to attacks of organisms which gain entrance through skin punctures. Whenever the skin of a mature apple is broken a fungous rot is almost sure to develop. The fungi which most frequently cause these rots are incapable of penetrating the sound skin, but rots speedily result when they gain access to the flesh and juice of the apple. Skin broken on green apples has a chance to heal, but this power is lost as the fruit matures, hence the great importance of careful handling to prevent mechanical injuries of ripe apples.

Among the fungi of this class which cause storage rots the most common is *Penicilium*, the familiar “blue mold.” Another common fungous rot is caused by *Alternaria*, which is a “black mold.” These two are the most common in the Northwest, but rots due to other “molds,”—pink, white, gray, and various other colors, also occur. Careful handling will reduce these rots to a minimum, and in picking, hauling, putting the apples over the grading machines, and in packing attention should be given this detail. The mechanical graders now in general use are of great utility, but like all conveniences, their benefits may obscure some abuses. The machines are frequently crowded, so that the apples pile up either at the sorting end or in the bins, resulting in numerous stem punctures. Another prolific cause of broken skin is found in finger-nail punctures. Every handler of apples should be required to wear gloves. Greater care in box nailing should be insisted upon also, for protruding nails

Continued on page 23.



Jonathan apple affected with what is known as Jonathan spot. This disease is not a fungous disease. It usually develops after the apples are placed in storage and is believed to be caused by over-irrigation and allowing the fruit to remain on the tree until it is too ripe. Idaho lost 40,000 boxes of Jonathans in 1917 from this cause after the fruit had all been placed in storage.

Specific Results in Pollinating the Bartlett Pear

By Warren P. Tufts, Professor of Pomology, Agricultural Experiment Station, University of California

THERE is a growing interest on the part of pear growers in California and elsewhere in the Pacific Northwest concerning the question of whether the Bartlett, their chief variety, requires or is benefited by cross-pollination. The fact that Bartlett trees, planted without any regard to cross-pollination, have yielded profitable crops, has led some to believe that the variety is self-fertile. On the other hand, these same growers have noticed when they have a stray tree of some other variety in their orchard that the surrounding Bartletts are more abundantly fruited than the remainder of the orchard. This seems to indicate that the Bartlett, under valley conditions, is greatly benefited by cross-pollination. In the Sierra foothills thoughtful and observant growers have felt sure that the Bartlett, under their conditions, is always self-sterile, to a degree rendering cross-pollination imperative.

Although practically all writers agree in advising the interplanting of other varieties to pollinate the Bartlett, even in the valley locations in California, nevertheless the bulk of the acreage planted to Bartletts in the state contains no other variety. The writer outlined and performed certain experiments dur-

ing the seasons of 1916, 1917 and 1918 designed to test the accuracy of the observations enumerated above.

Organization of the Work.

The methods employed for investigating the various problems were those commonly in use in cross-pollination experiments. Briefly stated, this part of the work consisted in the application by hand of the pollen desired, having first removed the flowers' own pollen-producing organs (the stamens). The introduction of foreign pollen through the agency of wind and insects was prevented by covering the hand-pollinated blossoms with paper sacks. Accurate counts of the flowers were made and recorded. Later in the season the sacks were removed. The fruits resulting from these artificial pollinations were counted and the proper record made after the first and second crops and again at harvest.

The Results.

The results of all the experiments in connection with this work were interesting and showed conclusively the benefits of cross-pollination. Eliminating some of the more technical phases of the work, however, the result of an experiment designed to show from the average yield of two orchards what should be expected from cross-pollination under normal conditions will probably be

of most interest to the Bartlett pear orchardists or those who intend to plant this variety of pears. This result is as follows:

The orchard of Mr. P. M. Beaser, of Chicago Park, Nevada County, consists of one thousand Bartlett pear trees, no provision having been made for cross-pollination. These trees are perhaps twenty-five years old. There is located on the Loma Rica Ranch, some eight miles away, a small block of old Bartlett pear trees of about the same age and vigor as those on the Beaser place. Many of these trees have, however, during the past six or eight years, been top-worked to other varieties. With the exception of the presence of pollinating varieties at Loma Rica the two orchards just described are in all respects comparable. Both orchards bloomed profusely.

COMPARISON OF YIELD ON BARTLETT TREES WITH AND WITHOUT POLLINATING VARIETIES, 1918.

(Loma Rica Ranch, Grass Valley)

With pollinating varieties:

No. of blossoms counted	3007
No. of fruits set May 17.....	449
Per cent set.....	14.9
Average yield per tree in packed boxes.....	2.19

(Beaser Ranch, Chicago Park)

Without pollinating varieties:

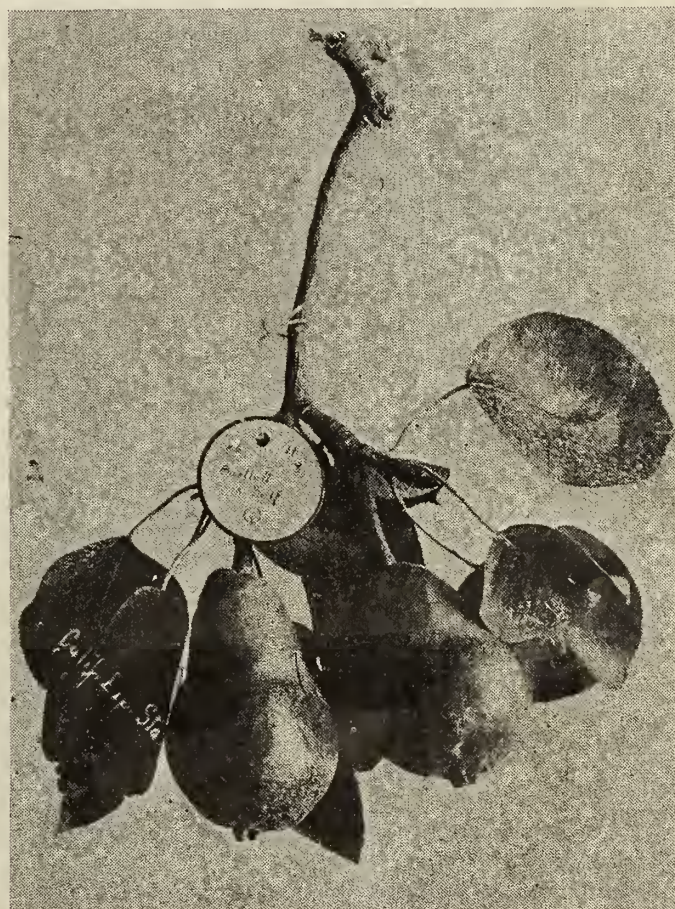
No. of blossoms counted.....	3170
No. of fruits set May 17.....	192
Per cent set.....	6.0
Average yield per tree in packed boxes.....	.77

The figures show that the trees provided with cross-pollination produced a crop almost three times as great as that produced by the trees which did not receive cross-pollination. It should

Continued on page 21.



Ten Bartlett pears set from twenty-five blossoms pollinated with Winter Nelis pollen. A typical cluster resulting from crossing Bartlett with Winter Nelis.



Two Bartlett pears set from eight blossoms pollinated with Bartlett pollen. A typical cluster of this variety when self-pollinated.

Dehydration as a Factor in the Fruit and Food World

By W. H. Walton, Editor Better Fruit



Receiving loganberries for dehydration at the plant of the King's Products Company, Salem, Oregon.

THE preservation of food by drying has been in use for centuries and is probably the oldest known method which the human race has employed in food conservation. The process employed by the ancients and which is still largely employed is to place the fresh food, more particularly cereals and fruits, in the sun and allow the rays of this great heat and light-giving orb to gradually eliminate the moisture. In semi-arid sections where continuous sunlight can be depended upon over a considerable period this method of drying food is a success, with the exception that the food spread on trays out of doors is a prey to the insects and gathers considerable dirt, due to sudden gusts of wind and the dust particles that are in the air at all times during the dry season. These handicaps are no small objection to sun-dried food, in addition to the fact that some fruits and vegetables do not ripen until the rainy season sets in and puts an end to drying food by nature's process.

To meet the growing demands for dried fruits, such as apples, apricots, prunes, pears and some of the other tree fruits, evaporating machines were evolved, and, while they proved a success, failed to be adapted to the needs of the entire fruit, vegetable and other food kingdoms. It was this need that caused the birth of dehydration, which, reduced to its simplest terms, means merely the extraction of water, or the elements of water. "Dehydration," an expert on this subject says, "has come as a term to distinguish a special type of process to preserve fruits, vegetables, meats, fish and eggs for indefinite periods. Properly done, this process entails no loss of the original constituents of the material. The mineral salts, vitamins, acids, proteins, etc., are retained in their original fullness and the cellular structure remains intact.

The first experiments in drying foods according to this principle were not altogether a success, as the method of drying was accomplished by either a horizontal air wave passing over or a vertical wave passing through the material. Circulation was obtained by means of drafts and the natural rising of heated air. The temperatures during this process ran from 140 to 190 degrees and subjected the material to such an intense heat that its entire content was often made valueless. The basic principle of the new process of dehydration is a gradual extraction of the moisture content by means of low temperatures.

The material to be dehydrated is spread on shallow trays, which are slid into steel cars, and the cars then rolled into long, tightly sealed tunnels. The

process that takes place is similar to that of a warm arid wind. The temperatures are kept low, but the volume of air passing through the tunnels is rapid, varying from 25 to 50 feet per minute. Circulation is artificially created by fans, and the air is used but once, preventing the carrying of the odors and moisture from one tray to another. The moisture is removed so gradually that the cell structure of the materials remains intact, the flavor uninjured and the food value unimpaired. The retaining of the cell structure is probably the most important feature of this process, on account of the fact that when the finished product is placed in water it will reabsorb the original amount of moisture it contained, largely regaining in this way its fresh color and flavor and the wholesome, nourishing properties of the freshly gathered produce. In showing how greatly the weight of the fresh material is reduced when dehydrated the following table will be of interest:

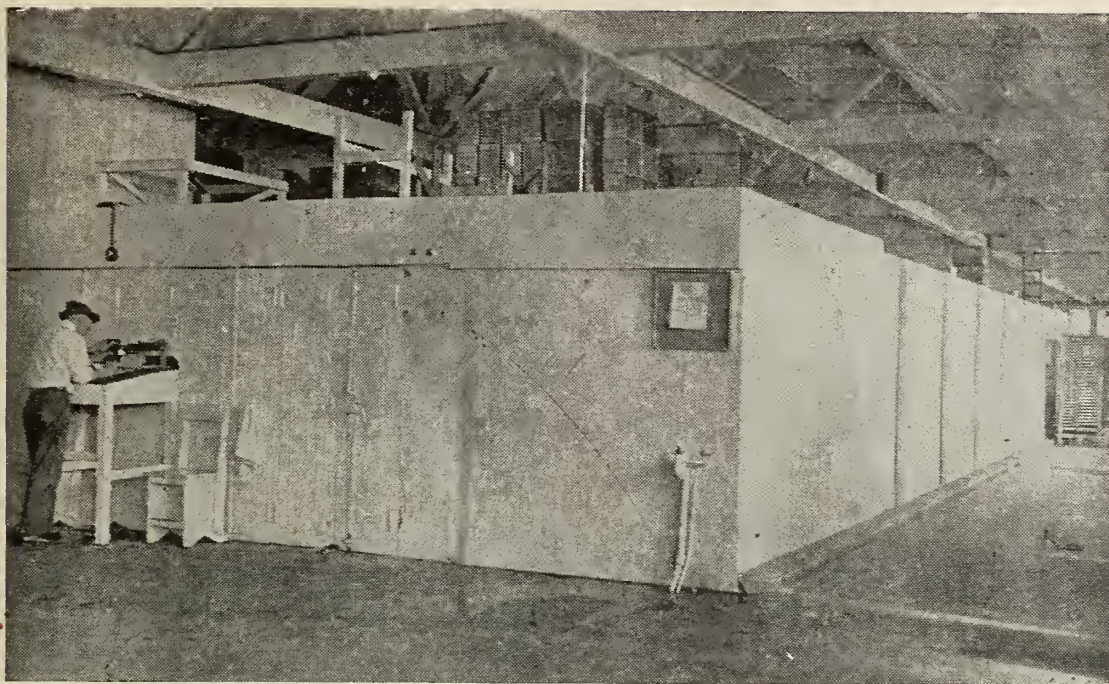
NUMBER OF POUNDS OF FRESH MATERIAL REQUIRED TO MAKE ONE POUND OF DEHYDRATED.

Apples	10
Apricots	5
Cherries (pitted).....	5
Loganberries	6
Pears (peeled).....	8
Peaches (peeled)	10
Prunes	3
Raspberries	6
Strawberries	8
Cranberries	6½
Beets	9
Stringless Beans.....	10
Cabbage	12
Carrots	10
Celery	20
Onions	10
Parsnips	8
Potatoes	6
Pumpkin	13
Rhubarb	20
Squash	9
Spinach	15
Tomatoes	15
Turnips	15

While the great economic value of artificial dehydration had been realized



Spreading loganberries on trays preparatory to being dehydrated. To the right can be seen the partially loaded steel cars which are used in routing the food materials through the plant.



View of room containing dehydrating tunnels. Points of interest are the "drylight construction," combined with the all-white interior finish and absolute cleanliness. The cars containing the fresh food are rolled into these tunnels, where the material has the moisture extracted from it without removing any of its other constituent forces or qualities.

and considerable progress had been made in the process, it remained for the great war to demonstrate its wonderful possibilities and to give it an impetus that now means unqualified success. The small space required to transport and store large quantities of wholesome fruit and vegetable food at a greatly reduced cost opened the eyes of the world to this new factor in food conservation.

It is not the object of this article to go into the comparative merits of dried or canned food. Both of these processes have an important place in the fruit industry and each of them to a large

extent covers a separate field. The outstanding features of successful dehydration are that it permits putting up the maximum amount of wholesome fresh food value in the minimum size package; is a new source of food conservation; a new market for the food producer and a new asset in the industrial welfare of the country. The more forms in which fruit and vegetable foods are made savable and available the greater will be the consumption, bringing with it added stimulation of agriculture and prosperity.

Like other forward strides in the fruit

industry, assured success in artificial dehydration had its birth on the Pacific Coast. In fact, Oregon is the cradle in which it has been nursed along, until now it is spreading out its arms and will no doubt soon be reaching into the other sections of the Northwest. The largest and best known establishments of this kind are those of the Kings Products Company, one of which is located at The Dalles, Oregon, and the other at Salem, Oregon. It is understood that this company is also making arrangements to locate plants in other sections of this state and also in Washington.

The establishments that are being built by this company are models in the way of factory construction, being big and airy and with sanitation as the dominating feature. The products are handled so as to minimize as much as possible exposure to air or human hands and the entire process and system for turning out the finished product is on a basis that is fast making American industrial institutions the finest of their kind.

The great importance of the dehydration process has just been recognized by the government, which has made a large appropriation to be used in conducting experimental work in this industry on the Pacific Coast. Part of this sum will be utilized in installing a large and fully equipped laboratory at the plant of the Kings Products Company at Salem, Oregon, and a laboratory will be located in California also. Both of these establishments will be used to carry on scientific investigations to promote the development of the industry.

Packing the 1919 Northwest Apple and Pear Crops

Written for Better Fruit by an Experienced Fruit Handler

NOTWITHSTANDING the strong demand for apples and pears this year, buyers are announcing that they will not accept fruit that is not correctly packed and strictly up to grade. Buyers are making this announcement owing to the fact that last year a comparatively light crop, coupled with an unexpected demand, resulted in throwing on the market large quantities of inferior fruit, badly packed, which got by as the trade was so great that almost any kind of an apple or pear packed in almost any kind of way could be sold. This, it is pointed out, will not be allowed this year, and a rigid adherence to standard grade and pack will be insisted upon.

Packing Rules Being Enforced.

There are practically no changes in the grade and pack of Northwest apples this year. The Northwest standard box, 10½ x 11½ x 18 inches inside measurement, has now been adopted in all districts, and there is a probability that it will be made the national standard container for box apples by an enactment of Congress. There has been a tendency during the past year to force growers to be more careful in the matter of pack and grade and in some states laws have

been passed to this effect. California now has a law which stipulates the rules for packing and grading fruit in that state and provides for fines for those who fail to comply with the provisions of the measure. The law requires that each box of fruit must be marked with a stamp provided by the state, stating that it has been graded and packed according to the official requirements. It is expected that the other Pacific Northwest states will later adopt such a law.

Labor Saving Devices.

In packing out the 1919 crop of apples labor-saving devices will play a more important part than in former years. There are several reasons for this: shortage of expert labor in the fruit industry; the fact that a better grade and pack can be put up; that crops can be handled more quickly and economically, and that growers made a sufficient profit last year to allow them to invest in up-to-date orchard and packing house equipment. New acreage coming into bearing in the Northwest is also naturally playing its part in stimulating the sale of this apparatus. The main reason, however, for the greater adoption of modern equipment by the

progressive orchardist is its efficiency and economy. The latest and best makes of picking ladders and utensils, wiping and grading machines, packing tables, box presses and conveyors have demonstrated so thoroughly to the grower that greater profits follow their use that few orchardists who have crops large enough to establish a packing house now attempt to market their crops without having most of these appliances.

Undoubtedly the greatest boon that has come to the box apple grower in the last decade is the power grader and sizer, which has reached its greatest degree of efficiency in the Northwest. There are now several types of these graders being manufactured on the Pacific Coast, all of which do efficient work. What the power grader has done in helping the orchardist to pack his fruit better and more economically, the conveyor is now doing in many sections to more cheaply handle it from packing table to car.

Grading Most Important.

Grading for quality is the most important feature of apple packing, for while perfection has been almost attained by machines in sizing the fruit,

no machine is human—it cannot see imperfections and judge of color. It takes a quick and experienced eye and hand to detect imperfect fruit, or fruit that should not go into the best grades on account of lack of color. Where possible, experienced hands should be selected to grade apples for quality and they should be fully instructed each year in any changes in the provisions for disqualifying the fruit on account of blemishes or color. Where it is not possible to employ experienced graders, they should be put to work under the supervision of an old hand for instruction and to carefully watch their work. The pack is very important, too, but it should be remembered that a competent packer can make a good appearing pack from fruit of any quality, provided it is properly sized. The packers are expected to keep their eyes open for fruit of inferior quality that gets past the grader and remove it, and while they do this to some extent, they are inclined to pack anything that comes to the table from the sizer and graders. In years when apples are high in price some growers have a habit of winking at this practice and taking a chance on getting by. This idea, however, is a bad one from all points of view. It lessens the morale of the packing house crew, causes the grower's pack to be looked upon with suspicion and ultimately results in a distinct loss in his profits. The apple sorter or grader, therefore, is the most important factor in a packing house, for, if he does his work efficiently and conscientiously, he can force a careless packer or an unscrupulous grower to put up a good quality pack.

Progress in Packing Apples.

While the mechanical grading of apples has simplified apple packing, it is still somewhat of a science, and everybody who tries cannot make a success of it. To be a good apple or pear packer requires a quick eye for gauging size, deft hands, a large amount of nervous energy and a goodly percentage of horse sense and common honesty. In the last few years fruit packing has become more or less of a fixed occupation for hundreds of expert packers, who travel along the Pacific Coast between California and the Northwest states packing out the various fruits during their seasons. As apple and orange packing are more nearly alike, large groups of these professional packers now come from California to the Northwest each year during the apple packing season and return to the citrus belt in time for the first orange crop.

In addition to these professionals are the still larger groups of resident packers who pack out the greater proportion of the Northwest apple crop and on whom the growers of the various dis-

tricts rely to a greater degree than on the migrations of the hobo packers. The yearly influx of these professionals has, however, been of considerable benefit to the apple packing game, as they have brought with them from time to time improved methods, such as better trays for holding apple wrappers, quicker ways of placing the apples in the box and surer systems for a pack true to size.

The fundamental principle for a beginner in learning to pack apples or pears is to become familiar with the various standard packs and learn to put them up correctly before trying to gain speed. The novice in attempting to get too much speed at the start is very likely to lower the excellence of his pack. Having become thoroughly versed in how to pack, rapidity in packing will naturally come to the beginner according to his fitness for the occupation. The cardinal point in packing apples is to have the pack, both in quality and size, as near perfect and as nearly representative of the grade marked on the outside of the box as possible. The correct bulge is also very essential, as it plays an important part in having the fruit ship well and also sell to a better advantage. The bulge is for the purpose of keeping the package tight and also to take care of the shrinkage, so that the buyer will be satisfied that he is getting a full package of fruit.

With the adoption of a standard apple pack for the Northwest a year or two ago, the experienced packer needs little instruction, but for the beginner the illustrations and rules for packing published in this number of BETTER FRUIT will prove valuable. By following these instructions, particularly those relating to starting the pack, the beginner should learn rapidly. The opportunity to attend an apple-packing school in advance of the shipping season, where experienced instructors are provided, will prove of the greatest assistance and should be taken advantage of by all beginners if possible.


Handling the Pear Crop.

The pear crop in the Pacific Northwest this year will be the largest ever shipped from this section and will be sold for the highest prices. More than the usual care, therefore, should be exercised in packing and handling it. Compared to apples, pears are relatively poor keepers. They are easily bruised, decay rapidly, and to get the best marketing results should be handled very rapidly from orchard to cold storage. In fact, where it is possible pears should be placed in cold or cool storage almost as soon as they are picked, and then if to be sold fresh should be packed out from the storage house.

The Time for Picking.

The time for picking pears should be watched very closely, as they ripen more unevenly than any other fruit, and if several pickings are made will keep better and many more of them can be sold fresh instead of being sent to the canneries. Pears should be picked when

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they have attained a mature size, although still green. When they have arrived at that stage of ripeness where they can be easily snapped from the spur they are ready to be taken to the packing house.

Packing.

Pears are packed very much the same as apples, although on account of their irregular shape the fruit at each end of the box in the alternate layers is turned with the stem end in. The method employed in packing pears is the 3-3 and 2-2 diagonal pack. The boxes are lined with paper, the same as in a fancy pack of apples, and the fruit carefully placed in wrappers.

In grading pears the best or fancy grade should be as near perfect as possible and be free from worms, bruises, stings, disease marks or defects of any kind. The second or choice grade consists of fruit that is free of diseases of all kinds, but may contain pears that are misshapen to a certain degree. Those which are slightly limb rubbed or have worm stings that have been healed over are also permitted in this grade. Pears are graded by the packer and are now packed from a packing table the same as apples, instead of being packed from the orchard boxes as formerly.

In the Pacific Northwest this year it is estimated that California will produce a crop of over 4,000,000 bushels of pears (its largest crop), Washington 1,600,000 bushels and Oregon 600,000 bushels.

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Oregon's Rapid Development in Horticulture

An Appreciation of the Progressive Work Done by Prof. C. I. Lewis and the Oregon Agricultural College for Horticulture by Better Fruit



Prof. C. I. Lewis, who for thirteen years has been Chief of the Division of Horticulture at the Oregon Agricultural College, and for the past six years Vice Director of the Experiment Station, has resigned to accept the position of organization and publicity manager of the Oregon Growers' Coöperative Association.

Prof. Lewis came to the Oregon Agricultural College on May 12, 1906. At that time there had not been a professor of pomology at the Oregon Agricultural College for four years. Prof. Lewis began at once to organize and build up the work, and demonstrated early that he recognized the essentials of good organization, by making a careful selection of men and surrounding himself with strong men, giving them every facility and every opportunity for work. The department of horticulture of the Oregon Agricultural College was the first one to establish a strictly research man, to add a fellow to the department, to raise a man to the associate professorship, and to a full professorship. It was this policy which rapidly developed

strong men in the Oregon horticultural field.

It was Prof. Lewis' policy to give these men every facility and encourage them in every way. That the policy was a wise one, the results of the Division of Horticulture themselves testify. During the thirteen years that Prof. Lewis was associated with the Oregon Agricultural College a large number of bulletins were issued by the division of horticulture. Some of the most famous are the pollination series, which had to do with the pollination studies of apples, cherries, and tomatoes; and the pruning series, the nitrate studies in Hood River, Rogue River and the Willamette Valley, with apples, pears, peaches, and prunes. Perhaps the most important bulletin issued was the Loganberry juice bulletin. If it had not been for the work of Prof. Lewis and his associates in 1911, 1912, and 1913, it is doubtful if the Loganberry industry would be what it is today. The first big commercial batch of high grade juice, 3,000 gallons was made by the division of horticulture at the Salem Fruit Union. This demonstration was so successful that it interested manufacturers and the result the following year was that the Phez and Loju firms began to manufacture this juice. It was felt by many that the juice would

not keep. Prof. Lewis demonstrated that it could be made easily, and kept, and that it had a wonderful future. Very helpful bulletins were issued from time to time on the packing and physical handling of fruit, walnuts, and pears, and others too numerous to mention. Prof. Lewis had great faith in the horticultural products work. Six or eight years ago he made a motion at the National Apple Show which was responsible for the formation of a committee to study the possibility of horticultural products work. For six years, Prof. Lewis worked hard to get a horticultural products building at the Oregon Agricultural College, and today the building is erected and completed, the first building of its kind in America, having a complete cannery, evaporation room, equipped for the evaporation of walnuts, vegetables, prunes, and apples, a juice room for the manufacturing of high grade juices of all kinds, and rooms equipped for the investigation of glaze and maraschino fruits, jams and jells.

The growth of the division of horticulture at the Oregon Agricultural College was very rapid. In 1906, one room in the old horticultural building, which is now the poultry building, was devoted to the work. The work expanded so rapidly that new space had to be provided, until today the division of horticulture occupies two floors and full basement of the large horticultural wing of the agricultural



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building, has a horticultural products building, a range of greenhouses, and about sixty acres of land devoted to horticultural work. On this land extensive experiments are being conducted along the lines of pruning, depth of planting of fruit trees, tree stocks, plant breeding, etc.

The teaching phases of the division have not been neglected. In fact, the success of the students has been remarkable. Heads of departments have been furnished to universities in Idaho, Arkansas, and North Dakota. Assistants in either station, college, or extension work have been furnished as follows: Five to Ames, Iowa, four to the University of Virginia, two each to California, Pennsylvania, and Alabama, and one each to the state colleges of Maine, Massachusetts, New York, Indiana, Missouri, Wisconsin, New Jersey, Washington, New Mexico, Kansas. About fifteen men have been furnished to the office of markets. In addition to this, a large number of men are employed as orchard foremen. The famous J. H. Hale orchards at Glastonbury, Conn., and Ft. Valley, Ga., have had Oregon Agricultural College superintendents. In a two-year period 200 men graduated from Oregon Agricultural College, were placed in positions bringing salaries from \$1,000 to \$6,000 a year.

Prof. Lewis was always a strong exponent of the laboratory and field idea in teaching horticulture, and insisted that his men must be taught to do things with their hands as well as being taught in the classroom. In a single year, 10,000 acres in Oregon were given assistance by students. Such work as budding, grafting, pruning, etc., was handled.

During his connection with the Oregon Agricultural College Professor Lewis has developed into one of the most able and best known writers on horticulture in the United States. He is a strong and versatile writer and covers any phase of this subject with equal facility and thoroughness. He has written many valuable articles for BETTER FRUIT and other national horticultural journals, and his work of this character is constantly in demand.

As a public speaker, Prof. Lewis is known in all sections of the Northwest. He has the ability to express clearly and in a way that the farmers can understand what he has to say. Raised on a farm, he understands the farmer's point of view. When it became necessary to seek an organization manager for the new Oregon Growers' Cooperative Association. Prof. Lewis was the one man in the state who was looked upon as especially fitted for this work.

Picking Elberta peaches in the Yakima valley began on a general scale on August 25. Some Elbertas had already been picked in the lower valley, but gathering had not been general in the Buena district, where the largest percentage of the crop is grown. Few growers were willing to pay pickers by the box, as they claim it results in such careless handling of fruit as to cause great loss. This year's crop is estimated at more than double that of a year ago, with fruit of extra high grade.

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BETTER FRUIT

An Illustrated Magazine Devoted to the Interests
of Modern Fruit Growing and Marketing.

Published Monthly
by

Better Fruit Publishing Company

703 Oregonian Building
PORTLAND, OREGON

Marketing the 1919 Apple Crop.

The 1919 barrel apple crop is now estimated at 12,850,000 barrels, or equivalent to about 38,500,000 boxes. The box apple crop is estimated at 30,675,000 boxes. Of this estimate, Washington, Oregon, and Idaho, in the order named, are expected to produce 23,000,000 boxes. California, Colorado, Utah, Montana, Arizona, and New Mexico will largely produce the remaining 7,675,000 boxes of apples.

Due to light production in the East and heavy and increasing production in the West, boxed apples are the big factor in the apple market for the first time in the history of the industry. The successful moving and marketing of this big crop of Pacific Northwest apples is, therefore, a matter for serious consideration. At the present time the prospects for a wide distribution of apples in the domestic trade, at very attractive prices, are bright. A light crop in the East with high prices for barreled stock should have the effect of creating a greater demand for box apples at more than satisfactory figures. In the export trade, particularly in England, however, there is considerable uncertainty. This is due to food control by the English government, labor troubles abroad, depreciation in foreign exchange and lack of information as to how much space can be obtained on ships for export shipments. The possibility of increased transportation charges and a railroad strike are also factors that must be considered in the export as well as the home trade.

Should the foreign and labor situations be cleared up and the selling agencies which are handling the Western domestic trade make arrangements for a wide distribution, the Pacific Northwest should have the most successful year it has ever experienced in the apple industry. If not, as the season advances, growers or owners of crops who have not sold will do well to watch the marketing situation closely. The situation is not one of too many apples, but with a restricted export trade, a case of properly distributing almost one-half of the apple crop of the United States over a consumption area that is from 2,000 to 3,000 miles away from the production points.

Plant for the Future.

Growers who expect to plant additional acreage to apples, or those who are contemplating planting a new orchard this fall, will act with wisdom if they will look into the matter of selecting varieties that are especially

adapted to the districts in which they are to be grown. In considering this point they should obtain all the information possible as to the varieties that bring the best price, produce the best average yield and for which there is liable to be the largest demand in future. This advice applies to pears as well as apples and the matter of pollination must also be considered in both cases. Before stock is purchased for planting, the number of pollenizers that are necessary for any particular variety should be provided for. The importance of planting under this method is fully set forth elsewhere in this number of BETTER FRUIT. The selection of stock is also very important and should be gone into carefully. Plant for the future.

How You Can Get Better Fruit's Apple Packing Chart

BETTER FRUIT's apple packing chart as it appears in this number, but printed on cardboard so that it can be hung in the packing house, will be mailed to anyone desiring it on the following terms:

One card FREE with a new subscription to BETTER FRUIT.

One card without subscription ... 10c

Twelve cards without subscription, \$1.00

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The New Oregon Association.

During the past month the Oregon Growers' Coöperative Association has made rapid strides. It now includes in its membership the majority of the Willamette Valley apple growers as well as a large proportion of the prune and walnut growers, and, as R. C. Paulus, general manager of the new organization, says, "It is winning its place in the sun." The policy that the organization managers of the association have adopted in presenting all the facts to the growers and in announcing that it is not the intention of the association to enter into conflict with the fruit industries already in the field where it is possible to co-operate with them, is winning for the new organization many supporters. It is felt that this is the true spirit of "Oregonization" of the state's fruit products, as proposed by Mr. Paulus, Mr. Hunt, Mr. Holt, Mr. Lewis, Mr. Langner and the others associated in the work of organizing the association.

Saving Labor.

The saving of labor is becoming more and more necessary to the orchardist, and those who have not already done so must look to putting by enough from their profits to secure equipment that will reduce this cost.

With wages, freight rates, box materials, paper and other items that go into the expense column in producing apples at a high level, labor saving devices present themselves as the greatest factor in reducing the cost of production. The using of modern orchard equipment is no longer confined to any particular section of the United States. It is rapidly being adopted in the barrel apple raising districts of the East and South as well as the Northwest, and this year California is taking it up on a wider scale than ever before. California has this year purchased a larger number of apple graders than in any one year in its history. Virginia is going to grade its apples more closely and even New York and Missouri, where apples are almost entirely packed in barrels, are establishing a more uniform and better grade through using apple sizers. All of these districts are adopting other efficient labor saving devices looking to a better grade and lower cost of production. Growers in the Northwest can not, therefore, lag behind. In fact, they should be in advance of the situation and benefit accordingly.

By-Products and Drying Plants.

A healthy condition for the future of the fruit industry is evidenced by the erection in all the sections of the Pacific Northwest of by-product and drying plants. These establishments are creating a big demand for both sound and imperfect fruit, the output of which reaches a wider and an entirely different market than the fresh. This demand, once created, should remain stable and call for an immense tonnage of cull fruit which has heretofore been wasted, or for sound fruit for which there was no market because it was too perishable to be shipped fresh. The psychological time to make this market for the superior fruit products of the Northwest is now, while the demand is on, and it is to be noted with satisfaction that progressive fruitmen are not slow in taking advantage of the opportunity.

Prohibition, bringing with it a national desire for fruit juice drinks, coupled with extensive advertising, is another factor that is building up a demand for Northwest small fruits that are adapted to this purpose, on a big scale.

Editorial Comment.

"By their fruits ye shall know them." With the largest apple crop in its history moving out of the Northwest this year the fruit of this section should be more widely distributed and better known than ever before.

From present indications 1920 will set a record as a mortgage lifter for the fruitgrower.

Don't forget to take measures against that last worm crop. It's not the early worm to look for this year, but the late one.

Speed the day when fruit and produce crooks will be ordered to beat it out of New York on a one-way ticket.—*Fruit Trade Journal*. Yes, and out of every other spot on the globe that fruit is shipped to.

From present advices a jackrabbit drive will be a small affair compared to the hunt for ladybug beetles this fall. The campaign to secure these insects has been mapped out over a wide area and the offensive against aphids will be renewed with vigor next spring.

The fact that Oregonians eat such large quantities of California walnuts when Oregon grows so many fine nuts, stirs the ire of Colonel Dosch of the Oregon State Board of Horticulture. Better to have them eat California walnuts than no walnuts at all, Colonel. The appetite is there, making a good basis to work on.

It is not generally supposed that figs will grow in the Northwest. And yet A. A. Quarnberg has two fig trees on his place near Vancouver, Wash., that are loaded with fruit that will mature. Is Quarnberg a wizard, or is it the climate?

That strip of land at Cape Cod, Mass., is no longer the only habitat of cranberries that are fit to grace the great American dish of roast turkey. Pacific Coast berries are plenty good enough, if not a little better, thank you.

What They Are Doing in California

The 1919 wine grape crop of California is estimated to have a value of \$12,000,000.

In his advice to orchardists on tree planting Commissioner Wren of the California State Department of Agriculture recently said:

"There exists this season a strong demand for, and a big shortage of, nursery stock. Prices are high, and from all indications the nurserymen will be unable to fill all orders. I would therefore urge all who intend to plant next year to place their orders at once. And,

while the prices of stock are high, I believe one should not defer planting on that account. A matter of a few cents per tree does not compare very favorably with the returns of a season when that tree gets into bearing."

California nurserymen are advised that opportunity is knocking at their doors in the way of propagating much of the nursery stock that is needed in the United States. Many nurserymen there are said to have been quick to see the possibilities of the future in this direction and have made large plantings. It is claimed for California that it can grow any kind of crop or fruit that is produced in the United States.

Reports from Tuolumne County indicate the largest crop of apples in the history of the county. In this region especial attention has been directed to the codling moth and spraying operations.

Date specialists and growers at Indio are devising plans for a new packing house to take care of this rapidly increasing industry.

Prof. A. L. Levett, state entomologist for Oregon, stationed at the Oregon Agricultural College, Corvallis, was a visitor in California last month. Prof. Lovett was reviewing the pear thrips situation in California, particularly with regard to control methods which may be applicable against the pest in Oregon. He made an extensive survey of the pear orchards in Santa Clara and Contra Costa.

G. A. Nehrhood of Paso Robles has placed orders for 276,000 trees for the coming season for himself and the Associated Almond Growers of Paso Robles. This is the biggest order so far this year for any county. It is made up of almonds, 70 per cent; prunes, 25 per cent, and the remaining 5 per cent are mixed fruits.

The following notice will be interesting to apple growers in other states in showing how California enforces its apple packing regulations. The notice was issued by the State Department of Agriculture and says: Beginning Monday, July 28, only apples bearing the state standard stamp or conforming to the requirements of the 1917 Standard Apple Act can be removed from transportation company terminals by consignee. All others will be returned to the shipper or removed to a cold storage plant and held until shippers conform to the required grade and marking, after which apples will be delivered to original consignee with a statement of storage, transfer and re-packing charges, if any, to be deducted from sales account to shipper. The law plainly states that the end of the boxes bear the name and address of packer or shipper, the variety and grade of apples, net weight or number of apples in the box and the date packed. These simple requirements were intended to advertise California apples, facilitate handling in transportation and by the trade, and to protect all parties concerned. Neatly marked boxes lend to appearance and appearance adds to value.

During the 1919 season California will ship to the markets of the world about 25,000 car-

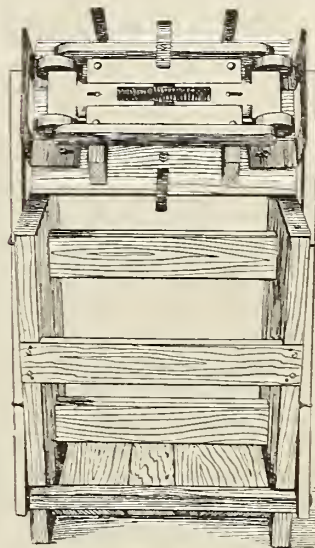
loads of deciduous fresh fruits, and while the cherry shipments probably will not reach more than 275 carloads (fresh), this amount with the canned cherry output makes the cherry crop one of the most successful and remunerative crops of the state.

Reports indicate that the 1919 crop of California peaches will total 10 per cent greater than the record yield of 1917. It is expected that about 12 per cent of the crop will be shipped as fresh fruit and the balance will be dried and canned.

Citrus growers of Riverside are now installing a new type of orchard heater that promises to give better service than was possible with those used in the past.

The first shipments of the California apple crop commenced to move about August 15. The variety shipped was what is known as the Skinner Seedling. Bellefleurs and Yellow Newtowns, which comprise the greater part of the California crop, move considerably later than this earlier variety, but are marketed much earlier than the winter varieties of Northwest apples.

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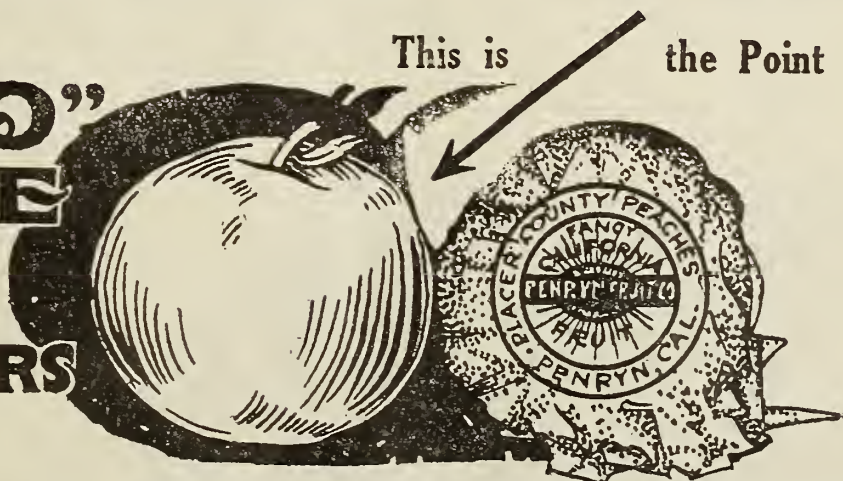
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Better Fruit's Standard Apple Packing Chart

All packs to go in the Northwest Standard Box—10½x11½x18 inches inside measurement

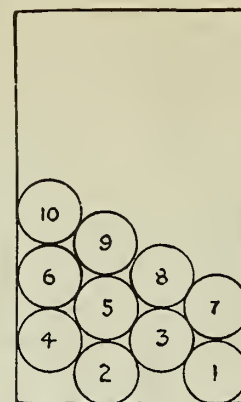
THE grading rules and regulations used in connection with these packs are those adopted by the State of Washington for the season of 1919 and are considered standard for the Northwest. All packs are for the standard apple box measuring 10½x11½x18 inside measurement. Description of all packs not illustrated can be found under the caption "Apple Packs."

The method for packing all of the packs not shown, with the exception of

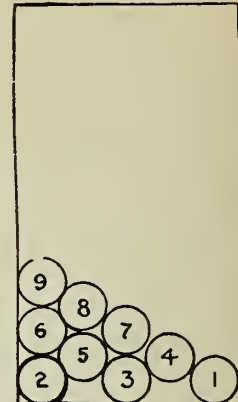
the 200 and 225 packs, is the same as depicted in the illustrations.

The 200 and 225 packs are straight packs, in which the apples are placed straight across the box, with the rows of apples resting on top of each, instead of being arranged to strike the depressions as in the diagonal pack.

The straight pack is now used for only the smallest sizes of box apples that are packed. A good example of a straight pack can be seen in the bottom illustration on the opposite page.

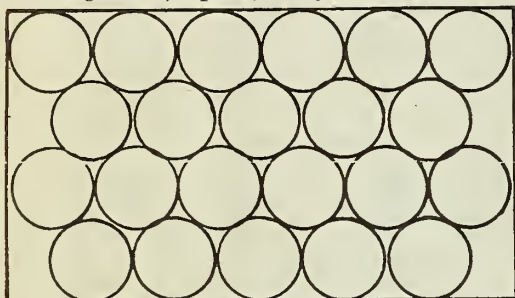


How to start a 2/2 diagonal pack

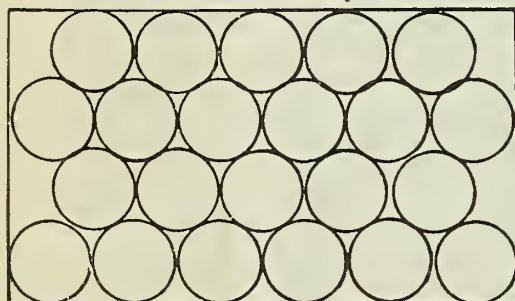


How to start a 3/2 diagonal pack

Diagonal 2/2 pack, 4 layers, 88 apples

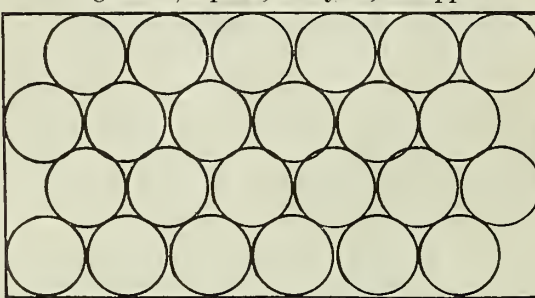


First and third layers

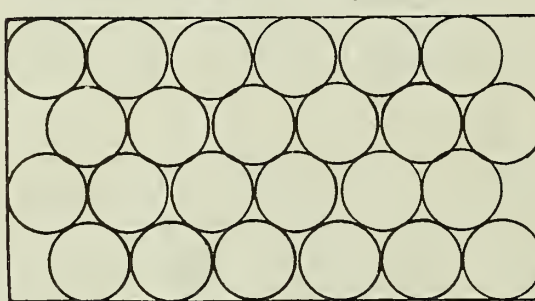


Second and fourth layers

Diagonal 2/2 pack, 4 layers, 96 apples

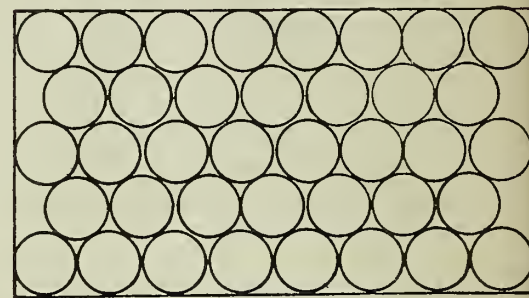


First and third layers

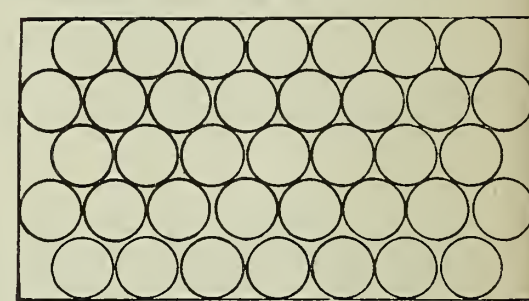


Second and fourth layers

3/2 pack, 4½ tier, 5 layers, 188 apples



First, third and fifth layers



Second and fourth layers

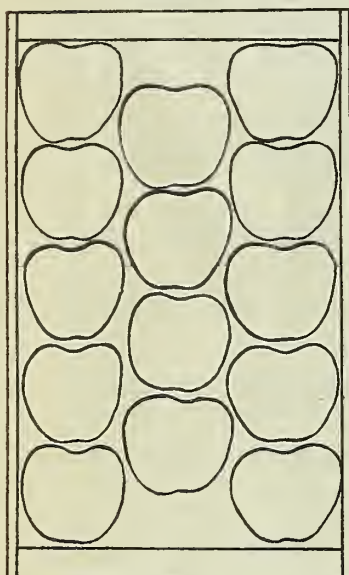


Figure 1—41 apples

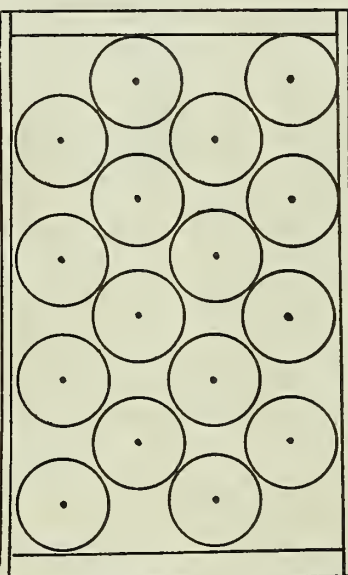


Figure 2—64 apples

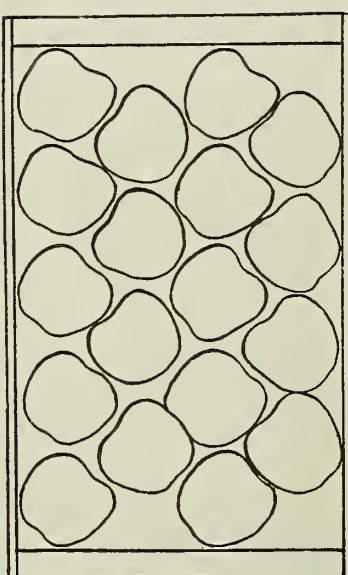


Figure 3—72 apples

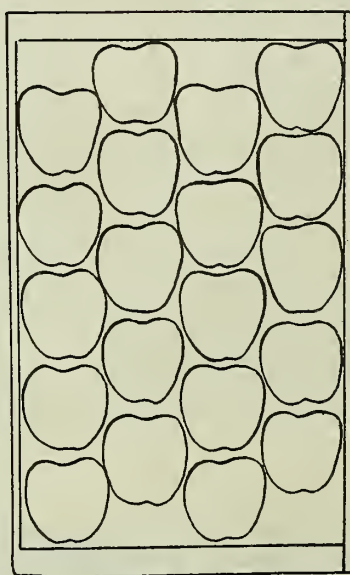


Figure 4—80 apples

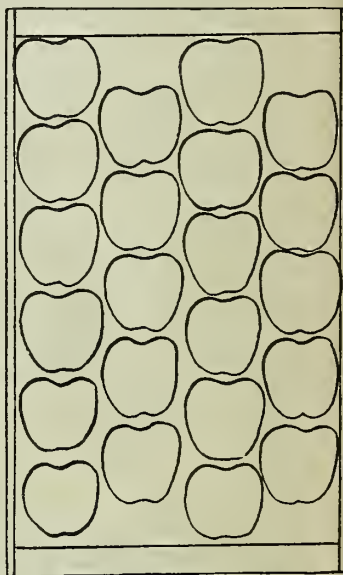


Figure 5—88 apples

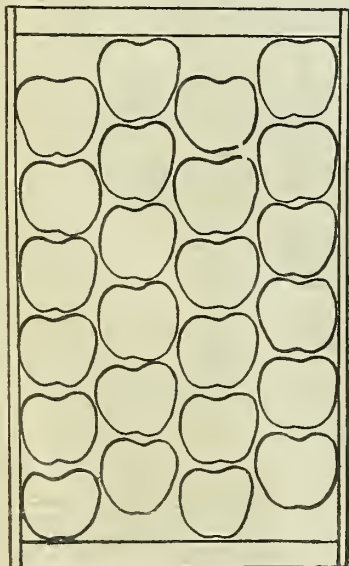


Figure 6—96 apples

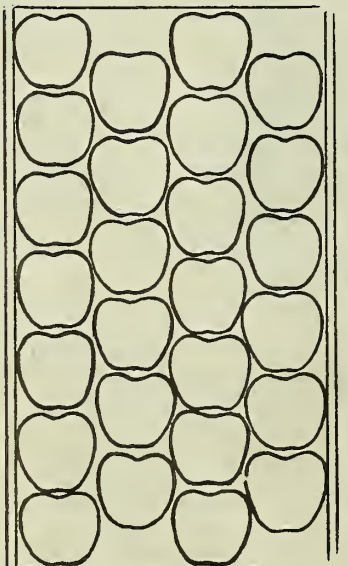


Figure 7—104 apples

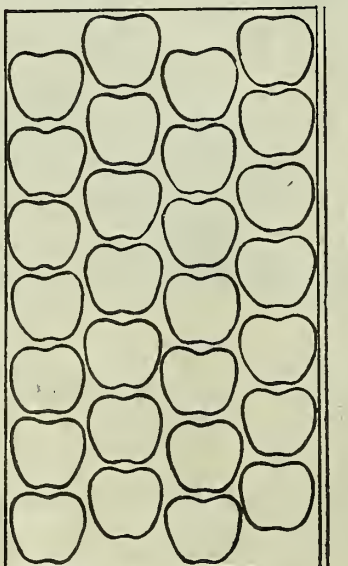


Figure 8—112 apples

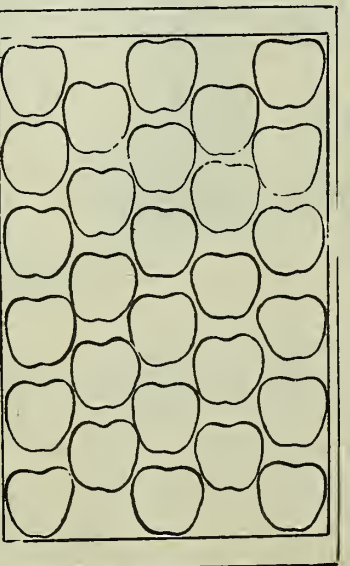


Figure 9—138 apples

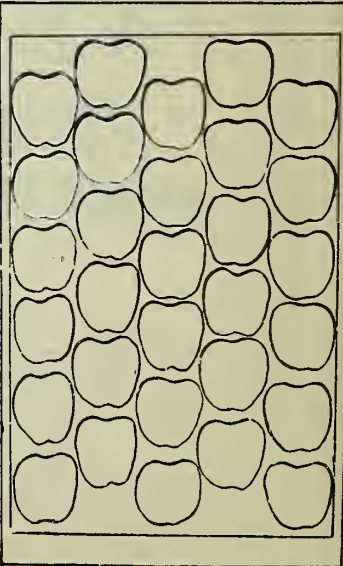


Figure 10—150 apples

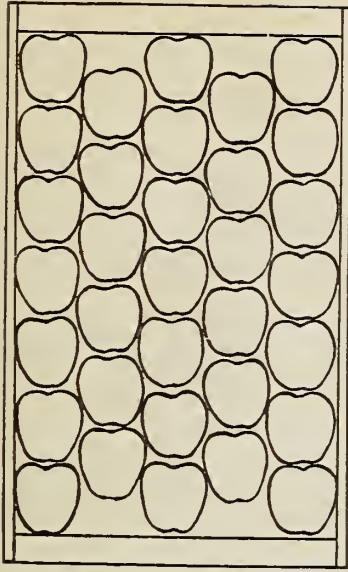


Figure 11—163 apples

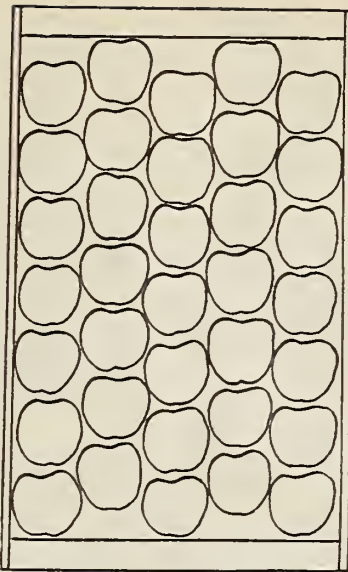


Figure 12—175 apples

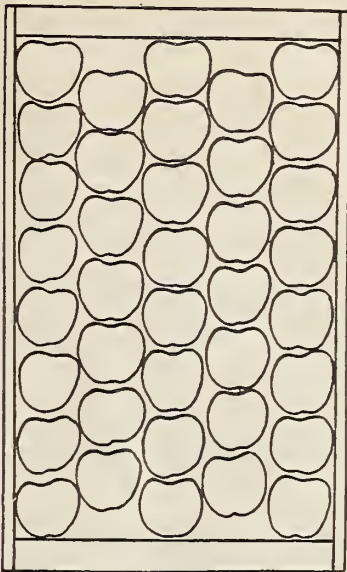


Figure 13—188 apples

Apple Grading Rules, Standard Pack, for 1919

First Grade, Grade No. 1 or Extra Fancy
Apples are defined as sound, smooth, mature, clean, hand-picked, well-formed apples only, free from all insect pests, diseases, blemishes, bruises and other physical injuries, scald, scab, scale, dry or bitter rot, worms, worm stings, worm holes, spray burn, limb rub, visible water core, skin puncture or skin broken at stem, but slight russetting within the basin of the stem will be permitted.

Second Grade, Grade No. 2 or Fancy Apples
are defined as apples complying with the requirements for first grade apples, except that slight sun scald or other blemishes not more than skin deep shall be permitted up to a total of 10% of the surface of the apple.

Third Grade, Grade No. 3 or C Grade Apples
shall include all remaining apples free from infection, excepting that two stings to each apple shall be permitted, and if shipped in closed packages shall be marked "Third Grade or C Grade."

Combination Grade may also include all other apple varieties not provided for in First and Second Grades.

When Second and Third Grade apples are packed together the packages must be marked "Combination Second and Third Grade."

Orchard Run. When First, Second and Third Grade apples are packed together, the package must be marked "Orchard Run," but Orchard Run packages must not contain any apples that would not meet the requirements of Third Grade.

Summer and Early Fall Varieties. Summer varieties such as Astrachan, Bailey's Sweet, Beitigheimer, Duchess, Early Harvest, Red June, Strawberry, Twenty-Ounce Pippin, Yellow Transparent and kindred varieties, not otherwise specified in these grading rules, together with Early Fall varieties such as Alexander, Blue Pearmain, Wolf River, Spokane Beauty, Fall Pippin, Waxen, Tolman Sweet, Sweet Bough and other varieties not provided for in these grading rules, as grown in sections of early maturity, shall be packed in accordance with the grading rules covering Fancy Grade as to defects, but regardless of color.

The following varieties shall be admitted to the Extra Fancy and Fancy Grades, subject to the color requirements herewith specified:

SOLID RED VARIETIES		
	Extra Fancy	Fancy
Aiken Red	75%	25%
Arkansas Black	75%	25%
Baldwin	75%	25%
Black Ben Davis.....	75%	25%
Black Twig	50%	15%
Gano	75%	25%
King David	75%	25%
McIntosh Red	50%	15%
Spitzenburg (Esopus)	75%	25%
Vanderpool	75%	25%
Winesap	75%	25%

STRIPED OR PARTIAL RED VARIETIES

	Extra Fancy	Fancy
Ben Davis	50%	10%
Delicious	66 $\frac{2}{3}$ %	15%
Geniton	50%	10%
Gravenstein	25%	10%
Hubbardston	50%	10%
Jefferis	25%	10%
Jonathan	66 $\frac{2}{3}$ %	15%
King of Tompkins County...	25%	10%
Missouri Pippin	50%	10%
Northern Spy	50%	10%
Rainier	50%	10%
Rome Beauty	50%	no color
Snow	50%	10%
Stayman	66 $\frac{2}{3}$ %	15%
Wagener	50%	10%
Wealthy	50%	10%
York Imperial	50%	10%

RED CHEEKED OR BLUSHED VARIETIES

*Perceptibly blushed cheek;
Tinge color.*

Hyde's King.
Maiden Blush.
Red Cheeked Pippin.

*Perceptibly blushed cheek;
Characteristic color.*

Winter Banana.

YELLOW OR GREEN VARIETIES

*Extra Fancy—Characteristic color.
Fancy—Characteristic color.*

Grimes Golden.
Yellow Newtown.
Yellow Bellefleur.
Ortley.
White Winter Pearmain.
Cox's Orange Pippin.
Northwestern Greening.
Rhode Island Greening.

APPLE PACKS

Style of Pack:

No. in Box

2x1 diagonal pack 5x5 long, 3 tier deep..	45
2x1 diagonal pack 5x6 long, 3 tier deep..	50
2x2 diagonal pack 3x3 long, 4 tier deep..	48
2x2 diagonal pack 3x4 long, 4 tier deep..	56
2x2 diagonal pack 4x4 long, 4 tier deep..	64
2x2 diagonal pack 4x5 long, 4 tier deep..	72
2x2 diagonal pack 5x5 long, 4 tier deep..	80
2x2 diagonal pack 5x6 long, 4 tier deep..	88
2x2 diagonal pack 6x6 long, 4 tier deep..	96
2x2 diagonal pack 6x7 long, 4 tier deep..	104
2x2 diagonal pack 7x7 long, 4 tier deep..	112
2x2 diagonal pack 7x8 long, 4 tier deep..	120
3x2 diagonal pack 4x5 long, 5 tier deep..	113
3x2 diagonal pack 5x5 long, 5 tier deep..	125
3x2 diagonal pack 5x6 long, 5 tier deep..	138
3x2 diagonal pack 6x6 long, 5 tier deep..	150
3x2 diagonal pack 6x7 long, 5 tier deep..	163
3x2 diagonal pack 7x7 long, 5 tier deep..	175
3x2 diagonal pack 7x8 long, 5 tier deep..	188
3x2 diagonal pack 8x8 long, 5 tier deep..	200
3x2 diagonal pack 8x9 long, 5 tier deep..	213
5 straight pack 8 long, 5 tier deep..	200
5 straight pack 9 long, 5 tier deep..	225

DIMENSIONS OF STANDARD APPLE AND PEAR PACKAGES

The standard size of an apple box shall be 18 inches long, 11 $\frac{1}{2}$ inches wide, 10 $\frac{1}{2}$ inches deep, inside measurement.

Pear—18x11 $\frac{1}{2}$ x8 $\frac{1}{2}$ inches, and outside length 19 $\frac{3}{4}$ inches.

3 $\frac{1}{2}$ -inch suitcase pack Peach-Plum—18x11 $\frac{1}{2}$ x3 $\frac{1}{2}$ inches.

DIMENSIONS OF APPLE BOX MATERIALS

Ends— $\frac{3}{4}$ x10 $\frac{1}{2}$ x11 $\frac{1}{2}$, 2 pieces, 20 to bundle.

Sides— $\frac{3}{8}$ x10 $\frac{1}{2}$ x19 $\frac{3}{4}$, 2 pieces, 40 to bundle.

Top and Bottom— $\frac{1}{4}$ x5 $\frac{1}{2}$ x19 $\frac{3}{4}$, 4 pieces, 100 to bundle.

Cleats— $\frac{3}{8}$ x $\frac{3}{4}$ x11 $\frac{1}{2}$, 4 pieces, 100 to bundle.

Thirty-two 6d nails commonly used per box.

RULES FOR ESTIMATING PAPER AND CARDBOARD

Apples and Pears.

Wraps for packing 100 boxes, 50 pounds.

Lining for packing 100 boxes, 7 $\frac{1}{2}$ pounds.

Cardboard for packing 100 boxes (apples), 16 pounds.

RULES FOR USE OF PAPER

Apples.

Use 8x8 for 188-200-213-225 Packs.

Use 9x9 for 175-163-150-138-125-113 Packs.

Use 10x10 for 112-104-100-96-88 Packs.

Use 11x11 for 80-72-64-56 Packs.

Use 12x12 for 50-48-41-36-32 Packs.

Pears.

Use 8x8 for 210-228-245 Packs.

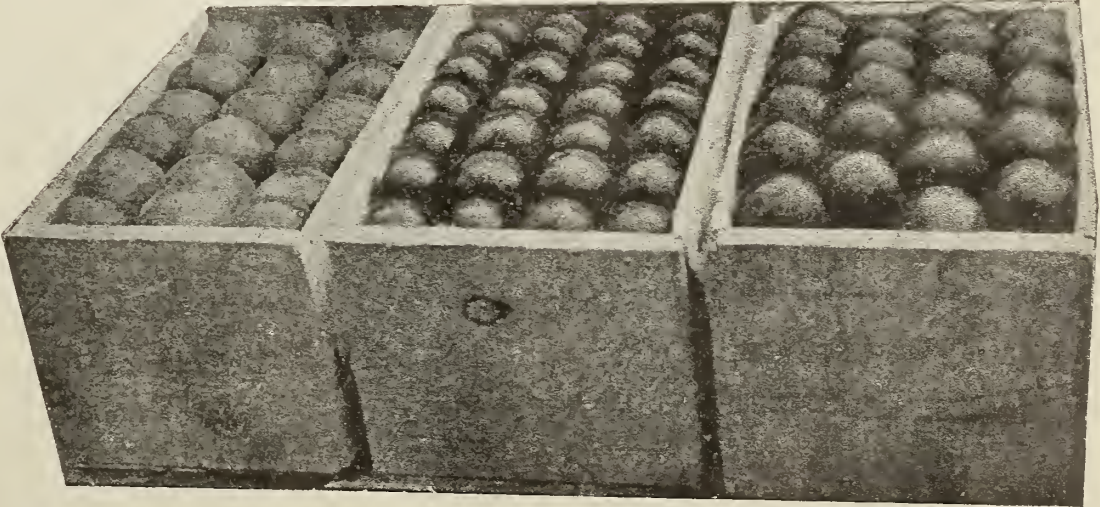
Use 9x9 for 193-180-165 Packs.

Use 10x10 for 150-135-120-110-100 Packs.

Use 11x11 for 90-80-70-60 Packs.

CEMENT COATED NAILS

Per keg: 4d, 55,000; 5d, 39,700; 5 $\frac{1}{2}$ d, 31,000; 6d, 23,600.



The above picture shows the proper and improper bulge for a packed box of apples. The box on the left is too low, the one in the center just right, and the one on the right too high. The box in the center is a good example of the straight pack.

Northwest Fruit Notes from Here and There

OREGON.

The quality of all fruit in Josephine county is reported by C. D. Thompson, county agent, to be excellent. Persistent spraying and other progressive methods are said to be giving this section a fruit crop that is almost entirely free of worms and fungus.

At Ashland and Medford the fruit crop is heavy and of fine quality. Satisfactory prices are being received and a very strong feeling of optimism for the future of the fruit industry in this section is reported. From 700 to 800 ears of pears and the same quantity of apples will be shipped from the Medford district this year. The peach crop at Ashland moved under very favorable conditions and the apple crop there will also command a good figure.

In order to properly handle the 130,000-box apple crop of the Parkdale district of the Hood River valley the Hood River Apple Growers' Association has decided to build a new warehouse there. The increase in the Parkdale crop is 100 per cent over that of last year. The strawberry crop of the Hood River valley this year amounted to over \$300,000. Of this amount \$255,761.44 was for berries shipped through the Hood River Apple Growers' Association. The average price per crate was \$3.76, which is said to set a new record in strawberry prices in the Northwest. The average price last year was \$3.33.

The lifting during August of the embargo on pears caused a bullish feeling on the part of Oregon pear shippers. The first Bartlett's to reach the eastern markets brought high prices and later shipments moved at a satisfactory price. D'Anjous, Winter Nellis, Comice and the other later varieties are expected to bring high prices.

Shippers in Oregon and the other Northwest states are now worrying a little over the possibility of a car shortage and the Fruit Growers' Agency and the Association of American Fruit and Vegetable Shippers are at work with railway officials endeavoring to prevent this occurrence at harvest time.

F. O. Mahan, manager of the apple packing department of the Eugene Fruit Growers' Association, announces that fifty carloads of apples will be shipped by the association this year from Lane county. The work of packing the earlier varieties started in the latter part of August. The Eugene association expects to handle a record tonnage of blackberries this year, a very large percentage of which will be canned.

Faith in the future of the loganberry industry in the Willamette valley is responsible for the purchase of a 160-acre tract near Salem by Senator Lachmund of the Phez Company and W. S. Walton of the Ladd & Bush bank. Many other tracts, both large and small, have been purchased recently near Salem, which will be set to loganberries, the future prospects of which as a money maker are very bright.

The Brownsville Canning Company, which also has a plant at Corvallis, handled a third of a million pounds of fruit before the season was half over. This operation involved the canning of thousands of pounds of cherries, raspberries, loganberries and blackberries. Later in the season the cannery will handle thousands of pounds of plums, string beans and other products.

F. M. Radovan is erecting a \$10,000 fruit drier at Medford. The plant will be completed in time to receive apples and pears and will be equipped for the evaporation of all kinds of fruits and vegetables.

Owing to the unusually dry summer, peaches and apples in unirrigated sections in Oregon are reported to be small, due to insufficient moisture and also thinning. In irrigated sections, however, apples are of good size and heavy in yield.

Growers in the Hood River valley, which has its record crop of apples this year, were warned in the past few days that the last brood of codling moth was due to appear much later than usual and were advised to spray carefully notwithstanding the lateness of the season. The same condition is said to have been found in Washington, and horticultural inspectors in that state have been warning growers to take precautions to guard against a late worm crop.

Roseburg, Salem and other sections of the Willamette valley are preparing to harvest their prune crops, and driers and other needed equipment is being put into proper condition

for the season. Salem, Roseburg, Sheridan and many of these points in the valley will ship considerable quantities of apples this year and in a year or two the total tonnage of apples will be large. It is expected that 500 cars of apples will be shipped from western Oregon this year.

The prune wage scale recently fixed at Roseburg is as follows: Driermen, \$6 a day, 12-hour shift; traymen, \$5 per day; shakers, \$4 to \$5, depending on hours put in. Pickers will receive 8 cents per box for Italians and 10 cents for Petites, with a bonus of 2 cents per box.

The Hood River Fruit Company has just completed a large two-story concrete warehouse situated near the railroad, which it will use in connection with its fruit business.

Sales of Oregon apples during the month have been reported at \$2.25 and \$2.40 per box and even higher. The top prices in the state so far have been given in the Hood River district. These prices are for the three grades of extra fancy, fancy and choice. At the same time unofficial quotations were giving prices on barreled apples in the East at \$6.20 to \$8.50.

The Marshfield Chamber of Commerce has volunteered to assist Coos county orchardists in harvesting and marketing their crops of apples this year and will supply boxes and provide help for picking and packing. Some very excellent apples are grown in this district which go on the market early.

Fire blight is said to be making its appearance in Linn, Benton and Marion counties, and growers are being warned to take quick action to combat it. Hood River growers have also been warned to keep a close watch for this dread tree disease, although no traces of it have been found there yet.

Over 1,000 tons of cherries of fine quality were harvested in The Dalles district this year. The peach crop there is also reported to have been good both in yield and quality.

WASHINGTON.

Eastern apple buyers are now said by the Yakima Valley Optimist to be showing a disposition to slow up in their apple purchases. This attitude, it is reported, has been manifest since the meeting of the International Apple Shippers at Milwaukie during the middle of August. Large eastern buyers, it is said, are of the opinion that the prices of western box apples are too high. The proposed raise of 12½ cents a box in the freight rate on western fruit is also being given as a deterring factor.

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AGENTS

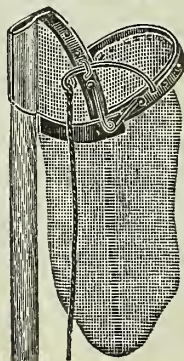
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in large apple sales to eastern buyers at this time.

The Selah Fruit Growers, Inc., now occupies a commodious new office, recently built adjoining its packing plant.

Lack of pollenization is reported by E. B. Kelly, horticultural inspector with the Washington Department of Agriculture, to be the cause of a big loss in the apple crop in the Inland Empire. Mr. Kelly says that orchardists in this district must pay more attention to the raising of bees, either with or without regard to the value of the honey they make.

An evaporator that will handle 1,000 tons of fresh fruit is to be erected at Grandview. The plant, which will be built by F. M. Martin, will largely handle apples this year but will include peaches and pears in its operations in future seasons.

A \$6,000 frost-proof fruit warehouse was recently opened for business at Dalton. The new structure is built of concrete and will have a capacity of 500 tons of fruit.

Development of eastern Washington orchards and establishment throughout the section of large by-products plants and glass container and box factories under the wing of a \$125,000,000 national corporation is the program which has been outlined for the fruit industry in the Walla Walla district by the commercial club of that place.

The Selah Spray Company has been merged with the Selah Fruit Growers, Inc. Both concerns will be conducted under one management.

A new cannery has been opened at Montesano with a sealing machine that has a capacity of 20 gallons per minute. George Halferty and J. C. Edney, of the Sea Beach Packing Company of Aberdeen and Copalis, are managing the new plant, which will probably do business under the name of the Montesano Canning Company.

Chelan county is elated over the fact that it may have a horticultural experiment station under the direction of the State Agricultural College at Pullman and the United States Agricultural Department. The proposition has the recommendation of State Commissioner of Horticulture M. L. Dean and the authorities of the state college.

Apple growers in the Husum and White Salmon districts have combined to fight fire blight, which is said to have made its appearance in the orchards at Lyle a few miles east of that section.

M. L. Dean, State Horticultural Commissioner of Washington, believes that the production in Wenatchee orchards can be increased 25 to 75 per cent by proper fertilization. Successful experiments with nitrate of soda that have come under Mr. Dean's observation forces him to the opinion that where the soil is lacking in proper nourishment this treatment will accomplish wonders.

A report was telegraphed from Walla Walla during August that the bottom had fallen out of the prune market. The ruling price up to the 18th had been \$100 per ton. It was alleged that after the break the fruit was offered at \$60 and declined. Next day the report of the slump was emphatically denied and growers were urged to stand pat, and refused to be stampeded.

The first carload of winter apples was shipped out of Wenatchee August 23d. It was destined for the Alaska trade and was made up of Winter Bananas, Delicious, Jonathans and Spitzenbergs.

IDAHO.

The harvest of the Idaho prune crop started in full blast about August 23rd, and growers pushed the work of getting the fruit on the market as rapidly as possible. Idaho prunes, most of which are shipped fresh, are reported to have brought good prices. Owing to adverse weather conditions in the spring, the crop was light.

The Fruitland District Fruit Growers' Association recently purchased a whole block in the town of Fruitland. The block adjoins the present packing house of the association and will be used to enlarge its plant.

The Payette Farm Bureau calls growers' attention to the benefits to be derived from providing comfortable quarters for fruit pickers and handlers during the shipping season. Its advice is to "make your help comfortable, pay a bonus at the season's end for good work and

pickers will keep contented. Contented pickers are money makers for the fruit grower."

State Fruit Inspector L. C. Vandenburg recently made a tour of the state in order to properly organize a thorough inspection during the heavy fruit shipping season.

It is reported that 3,000 satisfied Idaho residents went East on the excursion of the National G. A. R. encampment. Many of these took boxes of apples with them to show Easterners the excellence of western fruit.

H. Harland, L. E. Keeler and J. D. Baker have been appointed fruit inspectors for the district comprising Payette, Wood Spur and Crystal. All shipments of fruit in Idaho are to be state inspected as to grade and pack. If a shipper desires a certificate of inspection a charge of \$5 per car will be made. The inspections will be made chiefly at the various packing houses and will be under the direction of the Idaho State Department of Agriculture.

As in other districts there is a strong demand in Idaho for cull apples to be shipped outside of the state. Arrangements for the

shipments will be permitted, provided the shipper procures a license to ship and the state they are to be shipped to will permit them to enter.

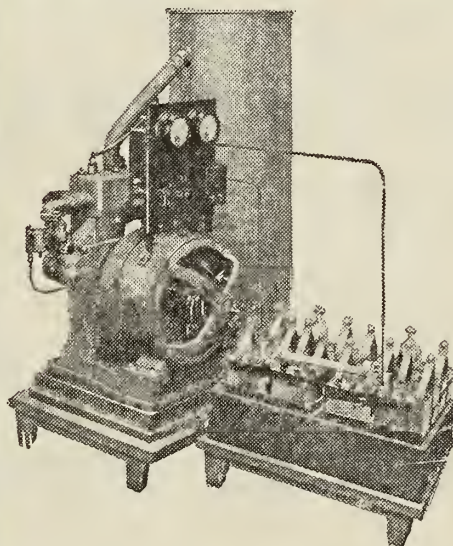
The canning plant at Payette was a very busy place during the cherry and apricot season. Fifteen tons of cherries and 30 tons of apricots were put up. Before the season is over the plant expects to handle 100 tons of peaches, 50 tons of pears and the output from 30 acres of sweet corn which was especially grown for the cannery this season. The yield of corn, it is reported, promises to be good.

Idaho orchardists predict the largest crop on record in that state this year. Last year the apple crop in Idaho was a failure, but in 1917 a bumper crop was harvested and 500 carloads were shipped from the central section. This year the crops look better than ever and estimates give the state a total yield of 4,000 carloads.

The Payette Independent in its farm bureau notes calls attention to the serious lack of cold storage in that valley. "The apple crop of the valley," it says, "is estimated at about 2,500 cars, valued at an average price of \$1,800

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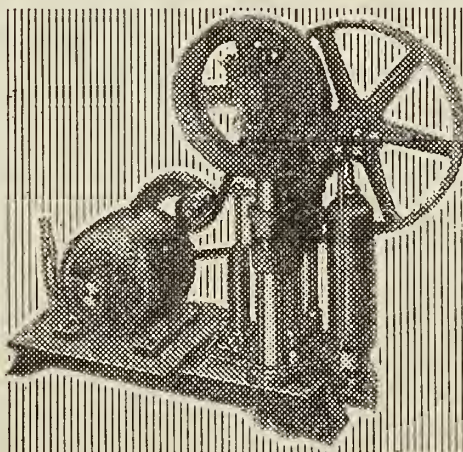
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per car, or a total of \$4,500,000. Some 1,500 people will need to be imported to help local residents to harvest the crop. We estimate \$50,000 will be lost on over-ripe Jonathans because of a lack of cold storages. And \$50,000 would help pay quite a number of mortgages. Two large dirt storage cellars that are being built by L. E. Peterson and Henry Reins as an experiment are expected to save many cars of Jonathans.

MONTANA.

Fire blight appeared in many orchards in June and July. As a rule not over six or eight branches per tree were infected. Jonathan, Rome Beauty and Crabs were the varieties which showed the most injury.

One new outbreak of codling moth was found in the Bitter Root Valley. All orchards in the near vicinity have been carefully inspected and plans are being made to prevent further spreading. All possible precautions will be taken to maintain the past reputation as the home of the "wormless" apple.

On account of the favorable weather conditions, and the spraying program followed by the growers, scab is conspicuous by its absence. Only where wilful neglect is the system followed can traces of scab be found. As will be remembered, there was practically no scab last year.

Despite the late spring frosts there was a good crop of sour cherries which found a ready market at five cents per pound at the canneries. Many crate shipments netted the grower eight cents per pound. The few sweet cherries grown in the valley sold readily at ten and twelve cents per pound on the trees.

The apple crop is much better than reported early in the season. While all varieties will be slightly smaller than usual, they will be very well-colored.

At his own request James M. Hamilton, who has for 15 years successfully administered the affairs of the Montana State Agricultural College as president, has been retired and is succeeded by Alfred Atkinson, who has been connected with the institution for many years. Mr. Hamilton will remain with the institution as dean of men and professor of economics at the same salary he was receiving as president. President Atkinson, the new executive, is said to be specially qualified for his new position and the affairs of the college are expected to go forward successfully and harmoniously under his guidance.

Timely Topics and Advice for Fruitgrowers

To destroy walnut aphid and the walnut worm, dust spraying has been found very beneficial. Results from this treatment in California have been even more gratifying than was expected. In orchards that had an infestation of 50 per cent worms last year and which were dusted, it is reported to be difficult to find even a single infested walnut this year.

Correct open pruning is worth dollars and cents to the orchardist, both from the standpoint of crop production and disease reduction. Pruning for an open condition of the top of the tree so as to admit plenty of air and light to all parts of the tree is also an important means by which losses of fungus infections may be lessened. The most successful fruitmen know this fact and bear it in mind when pruning. The continued presence on fruits or foliage of moisture from rain, dew or fog is exceedingly favorable to the germination of such fungus spores as those of apple or pear scab, anthracnose, brown rot, peach blight, leaf spots, etc., while any condition which tends to bring about a rapid

drying off of the leaves and fruit is decidedly unfavorable to infections. Sunlight and air movement are nature's great drying agencies. Open pruning by judicious thinning is therefore of great value because it permits air circulation and sunshine within the tree while ordinary heading back without thinning favors the formation of a dense top and thus retards evaporation.

It is generally agreed to be a mistake to consider that the direct application of a concentrated chemical fertilizer, such as nitrate of soda, to the soil is as effective in securing the best growth and vigor of the plants as would be secured by the addition of nitrogen in the form of organic matter. While nitrate of soda will stimulate trees and bring them from a devitalized condition back to a normal condition, in many cases it will not, however, exert much influence on the soil and therefore, in order to improve the physical condition of the soil in many orchards, it is necessary to add organic matter also. One of the best ways of introducing needed organic matter and nitrogen in an orchard is the growing of alfalfa or some other equally good cover crop, a method much to be preferred to the clean cultivation that was so long favored by leading orchardists and that it is still adhered to by many.

Finds Better Fruit 7,000 Miles from Home


H. F. Davidson, of Hood River, Ore., who recently returned from a 14,000-mile trans-continental and trans-Atlantic trip to investigate apple marketing conditions abroad, says that he is now convinced that publicity throws its pitiless glare into the four corners of the globe.

While away Mr. Davidson visited England, Denmark, Norway, and Sweden. Just before he left he wrote an article for BETTER FRUIT on the "Future of the Apple Industry in the Northwest," which was illustrated with his picture. On arriving in Stockholm, 7,000 miles away from Hood River, he secured an interpreter and started to make the rounds of the fruit dealers. He says that on entering the door of the first place he visited, the proprietor took a look at him, didn't say a word, but went to a table, took up a copy of BETTER FRUIT, turned over the leaves and pointed to his picture. Mr. Davidson nodded in assent that the picture was of him, and the Swedish apple man told him that he couldn't read the text but that he could understand the pictures.

The Stockholm apple man told Mr. Davidson that they taught English in the Swedish schools and that his children could read the articles in the magazine to him.

He then went over the magazine with his American visitor, asking about the various illustrations through the interpreter. The things that interested the foreigner most were the pictures of orchard equipment used in the Northwest, among others the Cutler apple grader, the mechanism of which he traced out with his finger and asked where the apples went in and where they came out and other things pertaining to the machine. Mr. Davidson also learned in Norway that one Norwegian orchardist had purchased a Cutler grader and that others were contemplating getting these machines and other up-to-date orchard equipment.

In relating this experience, Mr. Da-



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PORTLAND, OREGON

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vidson says that at the establishments of five other apple dealers in Sweden and Norway the same thing occurred. That as soon as he entered these places they got a copy of BETTER FRUIT and pointed to his picture. "I'm convinced now," said Mr. Davidson, "that wherever there is anything doing in fruit BETTER FRUIT is in evidence."

As the result of his trip Mr. Davidson believes the export trade for Northwest apples in England is a little uncertain, owing to government control of prices, labor disturbances and the depreciation in foreign exchange, but looks for a very favorable season at home. Germany, he thinks, will not buy many American apples this year on account of unfavorable political, labor and economic conditions, and is likely to buy what she does use from the Scandinavian countries. The latter, he is of the opinion, will not be in the market for a very heavy tonnage from this country. He reports the apple crop in England as about normal and much larger than he expected, and says that the situation there in regard to American apples may be cleared up later.

Horticultural Events of Interest

The thirty-fourth annual meeting of the Oregon State Horticultural Society was held August 14 to 16 at Astoria and Seaside, and while the attendance was not large, a number of valuable papers were read and discussions took

place that were of interest to horticulture generally. Ben S. Worsley, the retiring president of the society, presided at the business sessions of the meeting, and C. D. Minton acted as secretary. Among those who made addresses were the retiring president, J. O. Holt, manager of the Eugene Fruit Growers' Association; W. E. Schimpff, of Astoria, manager of the Pacific Cranberry Association; J. H. Butterfield, of Brown Meade, Ore.; H. G. Lechner, county agent of Clatsop county; Col. Henry E. Dosch, secretary of the Oregon State Board of Horticulture; Robert C. Paulus, manager of the Salem Fruit Union, and A. H. Harris, editor of Better Cooking, of Portland, Ore. The social features of the meeting included visits to the Astoria canneries and other points of interest. The new officers elected are: J. O. Holt, president; R. C. Paulus, vice-president; C. D. Minton, secretary; J. B. Pilkington and J. C. Atwell, trustees.

The combined Multnomah County Fair and Oregon Manufacturers and Land Products Show will be held at Gresham, Ore., September 15 to 20. An extensive premium list has been arranged for exhibits of fruits and other land products and it is expected that the event will be on larger and more successful scale than ever before attempted.

The Oregon State Fair is scheduled this year for September 22 to 27, and everything now points to one of the best fairs that have ever been held by the State Fair Association. Particular attention is being given to securing a fine horticultural exhibit as well as to the other features in connection with the fair.

The Washington State Fair will be held at Yakima, September 15 to 20, and as usual will be of interest to fruit growers and others interested in horticulture throughout the state. For several years the horticultural exhibit during this event has been one of the finest on the coast.

The Idaho State Fair will be held at Boise, September 22 to 27, with a finer exhibit of fruit this year than usual on account of the bumper apple crop in that state. The Montana State Fair was held during the week of September 8 to 12 and contained a number of splendid exhibits of fruit from the Bitter Root Valley.

The Mid-West Horticultural Exposition, which will be held this year at Des Moines, Iowa, November 10 to 15, was given an appropriation by the state of \$8,000 in addition to individual subscriptions, and conditions are said to be more favorable this year for a real horticultural show in the Middle West than ever before. A large and attractive premium list has been arranged and all sections of the country are invited to make exhibits.



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Specific Results in Pollenating

Continued from page 5.

also be noted that the favorable showing for the trees receiving cross-pollination was made in spite of the fact that this orchard lost much of its fruit as a result of the ravages of pear blight.

Recommendations.

From a study of the experimental data secured and also as a result of the observation and experience of many orchardists of the state, the conclusion is inevitable that all Bartlett orchards should be provided with facilities for cross-pollination.

The question at once arises as to what variety shall be selected as a pollinator. For foothill locations where the bulk of the crop is offered for "green" shipment this question is probably not difficult to answer. In these places the Anjou, Bosc, Comice, Howell and Winter Nelis are all excellent pears, bringing prices equal to or better than the Bartlett for Eastern shipment. These varieties may not perhaps give an equal tonnage with the Bartlett, but all are fair producers. The Comice should be avoided in windy locations, due to the fact that its skin is quite delicate and mars most easily.

In valley locations the question of providing cross-pollination for the Bartlett is more difficult. The grower must concede that where the set can be increased 100 per cent or more by the planting of one pollinating tree to every eight Bartletts the returns per acre will still be greatly increased, even though the fruit of the pollinating variety may have little or no commercial value. Although there has been no thorough attempt to test the adaptability of various varieties to different locations, the writer feels that the information in hand indicates that either the Hardy or the Winter Nelis will prove, from all standpoints, to be the most efficient pollinator for the Bartlett when grown under valley conditions.

Where the dried fruit is a primary product and where the fruit of the pollinator for the Bartletts must also be dried, special difficulties are presented. No experiments have as yet been conducted in this state to determine the drying qualities of the various varieties. In order to avoid the use of artificial evaporators, the pollinator must ripen its fruit at about the same time or shortly after the Bartlett. Practically all dried pears in California are sun-dried. Keeping specially in mind the time of ripening, the Howell and Hardy varieties seem to be the best pollinators for the Bartlett where the entire crop is to be dried.

Pollinating Agencies.

After having planted inter-fertile varieties the orchardist should by all means provide an agency for the transfer of the pollen from the trees of one variety to those of another. The common honey bee is by far the best carrier of pollen and it will pay the grower to keep bees, even though he may not care to go into the honey business. Bees, however, are a very profitable side line for the

orchardist, especially if alfalfa fields are available to work on after the blooming season of fruit has passed. About one hive of bees to an acre of bearing orchard should be provided. Preferably the hives should be scattered as widely as possible throughout the orchard during the blooming season. Experiment and experience have shown that little reliance can be placed on the efficacy of wind and of insects other than the honey bee in effecting the transfer of pollen from tree to tree, or in fact from flower to flower.

Eliminating from consideration all conditions which may influence the fruitfulness of an orchard except those occurring at blooming time, it may be said that the set is largely influenced by weather conditions at time of blooming. Cold weather, aside from killing the blossoms or lowering the vitality of the pollen, often prevents bees from working. The same is true if cloudy, wet and windy weather prevails. For their best work bees demand clear, warm and quiet days, and since the weather at the time of bloom is often quite unsettled,

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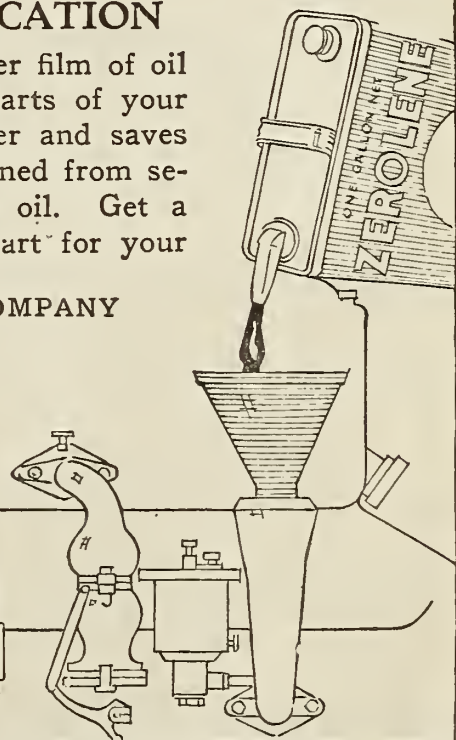
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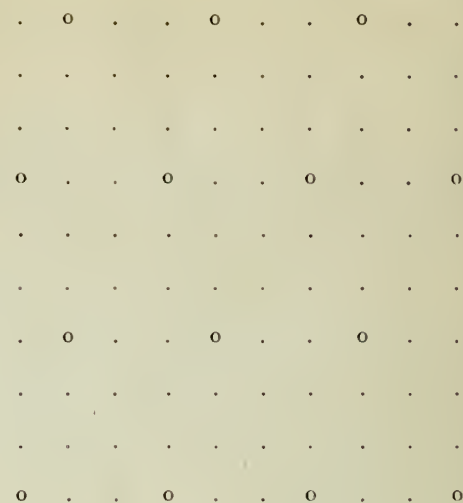
it is readily seen that the blooming period of the various pollinating varieties should overlap perhaps a week, in order that there may be one or two days at least when the weather will be favorable for insect pollination.

Arrangement of the Orchard from a Pollination Standpoint.

In planting an orchard it is desirable to have at least every sixth and preferably every fourth row of a pollinating variety. For convenience in the management of the orchard, it is best to plant two rows of one kind, then two rows of the pollinating variety, and so on; or, if it is desired to have more of one variety than another, four rows of the favorite variety, then two rows of

the pollinator, and repeat. For one reason or another, it is often desirable to reduce the number of pollinating trees to the minimum. Under these circumstances, one tree in twenty-five is perhaps sufficient, although at least one tree in eight is strongly recommended. It is seldom wise to graft over a part of a tree to the pollinating variety, as this tends towards confusion and added expense in harvesting.

In planting one tree of the pollinator to seven or eight of the main variety, the pollinator should be placed as every third tree in every third row in such a way that the spaces in the pollination rows are broken thus, the "o" in each case representing a pollinator tree.



If by chance a self-sterile variety has been planted in a solid block, the necessary pollinator may be introduced by grafting. Some relief may be obtained during the years while waiting for the trees grafted over to pollinating varieties to come into bearing by cutting off large limbs of pollinating varieties, placing the cut ends in buckets of water and distributing the same throughout the orchard during the blooming period. Such limbs will live for several days and continue to bloom, forming pollen for the bees to transfer to the self-sterile variety.



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Factors that Influence Diseases

Continued from page 4.

and splinters in the boxes are often overlooked.

If, with all care in handling, some apples with incipient rot infection do get into the packed box, there still remains one recourse to reduce danger of rot injury, and that is immediate cold storage. The effect of cold temperatures in slowing up the activities and life processes of plants is well known. It retards the ripening of the fruit and at the same time curtails the activity of the rot fungi. Investigations have shown that at 32 degrees F. most of these fungi are able to make some growth, and that if they have become established they will persist and resume vigorous growth as soon as the fruit is removed to a warmer temperature. However, since their most vigorous growth is made at temperatures of 70 to 80 degrees, the importance of immediately cooling of the fruit is apparent.

Non-Parasitic Diseases.

In the second general class of storage diseases, that is, those due to non-parasitic causes, we recognize two distinct types: (1) Those which are influenced by cultural conditions; and (2) Those which are influenced by storage conditions. Here we get into the realm of plant physiology and deal with the life and growth processes of plants.

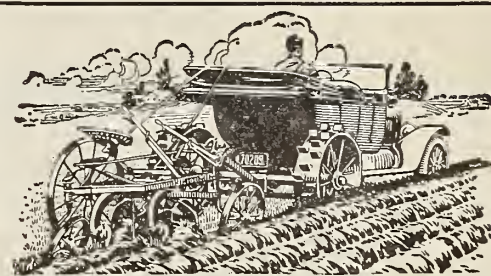
In connection with those diseases influenced by cultural conditions we may perhaps give chief consideration to nutrition. Plants live and grow through

processes somewhat different from those prevalent in the animal kingdom, but like all animals they are profoundly affected by their food supply, and many derangements can be traced to conditions of nourishment among plants the same as in the human family. One of such conditions that comes to mind is the overgrown apple, the apple that has been forced to abnormal size by heavy irrigation, heavy fertilization, heavy pruning, heavy thinning, or by growth on young trees. Such apples are not healthy, they are incapable of "holding up" in storage, they quickly reach the end of their life processes and die of "premature old age," or physiological breakdown, as we call it. The flesh becomes dry and mealy, turns brown, and the skin may crack as though burst by internal pressure. Such abnormally large apples are undesirable from any standpoint. They never possess the flavor of normal fruits, they are frequently undercolored, and, as has been pointed out, they do not keep. Avoid excessive stimulation, especially in the case of young trees just coming into bearing.

The other extreme in cultural practice, general neglect and poor cultural conditions, results in many bad effects. One especially concerns us in a consideration of storage troubles. It has been demonstrated that Yellow Newtowns are subject to an internal browning of the flesh when grown under negligent cultural conditions, whereas this variety grown by good methods will go through

the storage season free from this trouble.

The relation of irrigation to bitter pit, or Baldwin spot, another serious storage disease, has been established. This disease is greatly increased by heavy irrigation continued until picking time. It may be almost eliminated by light irrigation which checks the growth during the last month before picking. While bitter pit is generally worse on large apples than on small ones, heavy



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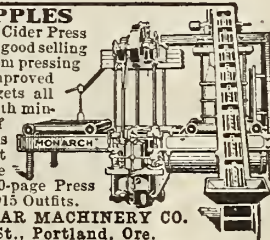
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It is built for the largest growers and packing houses who require a large output each day.

The sizing is by diameter or cheek measurement, the most perfect way fruit should be sized.

We build the Ideal Fruit Grader in four sizes to suit any grower's need, and it will do perfect work on **Apples, Pears, Peaches, Oranges or any other fruit having similar shape.**

We have designed our machine so there is absolutely no bruising of the fruit in any manner. The machine is very simple in construction, with nothing to get out of order or out of adjustment. Does not make the least noise, as there are no metal parts coming in contact with each other to cause a lot of wear and trouble.

The grading is done by elastic bands revolving crosswise of the belt that carries the fruit along the machine until it arrives at the proper bin where it comes in contact with this elastic which rolls it off gently into its proper bin without injury.

This season's crop is such that we have had to double our output to handle our orders, as we are replacing other machines of other makes that have cost much more than what we are asking for ours.

Our prices are very moderate, as we have no agents or brokers to pay a large profit for selling, so by selling direct to the users we can sell very close.

It will pay you big to write us to get more information and prices before you buy, for our machine will prove very satisfactory, as it has to many others for the past few years.

We have one of the most complete shops with the best of machinery to build every part over a pattern to get them exact.

Write us for prices stating your needs then we will gladly quote you prices on any size machine you need.

We also carry in stock the Bryant Clamp Warehouse Truck that will save you the price many times over each season in labor.

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irrigation, especially heavy late irrigation, will increase the disease on small apples the same as on large ones. That is, the disease is not primarily due to size and overgrowth, but to some conditions which produce overgrowth, whether heavy irrigation, heavy nitrogenous fertilization, or some other condition.

This disease may begin to appear before picking time, but the great proportion of apples are affected after they are picked and packed. However, it is safe to say that most of the apples which will develop the disease do so within a month or six weeks after picking. Therefore, if loss from this disease is to be avoided after storage, it is necessary to modify the culture of susceptible varieties. Under irrigation this is possible and feasible by reducing the soil moisture late in the growing season. But to do this one must know the nature of his soil—how well it retains moisture or how rapidly it dries out, so that he can regulate his irrigation accordingly. The question may well be asked as to what effect this will have both on the size of the individual apples and of the total crop produced, since both factors are concerned in the net returns. The results of some of our experiments at Wenatchee in 1918 may be cited in answer.

RESULTS OF IRRIGATION EXPERIMENTS ON
TWO PLOTS OF FOUR TREES EACH,
WENATCHEE, WASHINGTON.

	Heavy Irrigation	Light Irrigation
Total apples	1094	1426
Per cent 125s and larger:		
Of total apples	82%	45%
Bitter pit	54%	2%
Per cent smaller than 125s:		
Of total apples	18%	55%
Bitter pit	19%	0.6%
Total % bitter pit for plot...	48%	1%

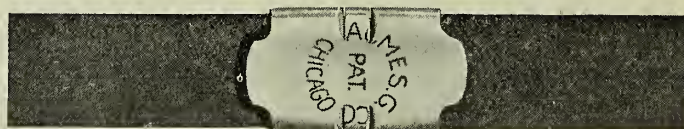
These results are approximately the same as have been obtained in similar work for several years past, and they have been so consistent that there is no escape from the conclusion that heavy irrigation causes a large amount of bitter pit to appear in storage, whereas light irrigation, especially late in the season, results in a minimum amount of the disease. It is for the grower to decide whether he prefers the 82% large sized apples produced by heavy irrigation, together with 54% of the same apples rendered unmarketable on

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account of bitter pit, or the 45% large apples secured by light irrigation with 2% loss on account of bitter pit,—or, considering the whole crop, whether he prefers the 48% loss occasioned by heavy irrigation or the 1% of disease occurring with light irrigation.

In considering the remaining type of physiological storage diseases, that is, those diseases influenced by storage conditions, we are dealing entirely with the artificial conditions by which we attempt to prolong the life of the fruit and hold it in good condition for later consumption. We store the apples either in a pit or a cellar, in an air-cooled storage house or in a commercial cold storage plant. The general plan upon which we work is, first of all, to hold the fruit as cool as possible in order to retard the ripening process. An apple is a living, breathing organism, and so long as it remains alive it is fit to eat. But when it reaches the end of its life it dies in a process we call physiological breakdown, a process previously mentioned in connection with the troubles of abnormally large apples. But aside from keeping the apples cool and at the same time keeping them from freezing, there are some other factors concerned in the successful storage of apples, factors which have been but imperfectly understood and consequently not given proper attention. Hence we find a number of storage diseases which can be traced to these conditions.

From the nature of the case we naturally expect that the influence of

storage conditions must affect the internal physiology of the apple. Consider the disease we call "soft scald" or "deep scald," which is especially common on Jonathans, Romes and other red varieties. It first exhibits itself in a fading of the skin color, the coloring matter of the skin apparently passes into solution and spreads into the adjacent tissue. When the apples are freely exposed to warm air the spots soon turn dark brown, and the flesh beneath softens and turns dark brown in color as the spots become sunken and definitely outlined. The skin usually remains smooth and tightly drawn. It appears not unlike an apple that has been in contact with a hot iron, and the trouble is sometimes exhibited in such a manner as to suggest that the apple was rolled over a hot stove. Large apples seem especially susceptible to soft scald. It has been demonstrated that this trouble is increased by an increase of carbon dioxide in the storage air (brought about by the "breathing" process of the apples), and by higher temperatures, and that a film of moisture over the apples (also produced in the "breathing") likewise favors the production of this disease. Mechanical injuries and bruises serve as centers from which the disease starts, and it is most common where apples touch each other or the container. Cold temperatures and good ventilation to carry away the respiration products are to be sought for in preventing this disease.

Brooks and Cooley have demonstrated

that Jonathan spot is a form of the ordinary apple scald, or "barrel scald," as it is called in the East. Jonathan spot is a superficial skin disease appearing in the form of brownish or black

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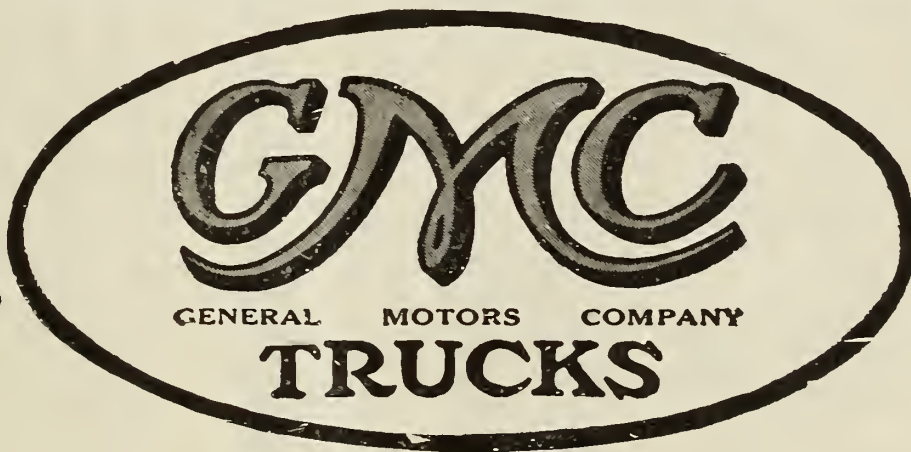
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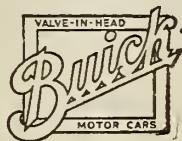
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flecks or "freckles" on Jonathans, Spitzburgs and other varieties. It is most important as a storage disease, although it is sometimes found on ripe fruit before picking.

Apple scald has been a puzzling disease. Apples go into storage in prime condition, with sound skin and apparently with every reason to suppose that they will hold in the same condition, and yet it frequently happens that after a period of storage, or shortly after removal to a warm temperature, scald is very prevalent. The disease exhibits itself as a superficial browning of the skin which does not usually affect the flesh or the eating quality of the apple, but it does spoil the appearance and consequently the marketability of the fruit. It may also be important as the forerunner of early physiological breakdown or of fungous rots which gain easy access through the affected skin. *Alternaria*, one of the fungi which cause rotting, is very likely to invade scalded apples.

We now have some investigations partially completed which throw new light on the nature of this disease, but since they are of a very technical character the practical application only need be presented here. We have verified the generally recognized fact that maturity of the fruit at the time of picking is one of the most important factors in the prevention of apple scald, and yet this seems to be less dependable with Eastern fruit than with that produced in the Northwest, possibly because Northwestern apples ripen more evenly. Working with apples alike in all respects except maturity, we obtained from 20% to 100% more scald on the green, immature fruit than on the well colored and mature specimens. The question, "What is the proper maturity?" naturally arises. The best answer we can give is that proper maturity is reached when the green ground color begins to lighten. After this it changes to white or yellow and the apple is well along the road to full ripeness. It is important to pick before the light ground color is well developed, in order to provide as long a storage life as possible. The red or bluish color cannot be depended upon as an indication of ripeness, and neither can the color of the seeds, since both are affected by other conditions.

We find it is frequently the case that apples in air-cooled or ventilated cellar storage do not scald, while those held



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in commercial cold storage are seriously affected, this despite the fact that it has been demonstrated that susceptibility to scald increases with a rise in temperature, and theoretically, therefore, that apples held in cold storage should be less susceptible to scald than those held in the warmer air-cooled storage. The unquestioned benefits of the colder temperature secured in commercial cold storage are largely nullified in many instances by the greater tendency of apples to scald. What is the reason? Some of our experiments give illuminating evidence on this question. We held Grimes, a very susceptible variety, under the following conditions: (1) Constantly in cold storage (direct expansion room) for seventeen weeks; (2) constantly in ventilated cellar storage during the same period; and (3) a lot which was brought out of the cold storage room at the end of five weeks and held for a few hours in the open air, then returned to cold storage and brought out again after ten weeks and held forty-eight hours before returning to cold storage for the balance of the seventeen weeks' period; that is, we simply ventilated this last lot on two occasions in the open air and returned it to conditions identical with those under which the first lot was held. At the end of the seventeen weeks all of the fruit was taken to a warm room to permit the maximum of scald development. After being subjected to the higher temperatures we found that the first lot developed an average of 65% scald, the second lot from 5% to 10%, and the third lot an average of 15%, which indicates clearly the influence of ventilation in the prevention of scald. We found that with the exception of a few tests on immature fruit, scald was prevented on all varieties and at all temperatures at which it occurs by stirring the storage air. A continuous air movement over the fruit of one-eighth to one-quarter mile per hour has been sufficient to hold the disease in check, but a more violent stirring of the air once or twice a week has given as good results as a continuous gentle air movement. From these facts it is natural to infer that apples will scald more seriously in unventilated rooms than where the air is frequently or even occasionally changed. It might be supposed that the direct expansion system of cooling in commercial cold storage plants would be less satisfactory from this standpoint than the bunker system. Theoretically this should be true, but in practice we find that there is frequently very little difference, since the so-called "air circulation" produced by the bunker system changes the air so slowly, if at all, that the air is not changed around the apples. The rooms are usually tightly packed with boxes, leaving no space to provide for air circulation. In a large, compact pile of boxed fruit there is little chance for the apples in the interior to secure any ventilation at all. We find that best results obtain from so stacking the boxes that air circulation between stacks is provided for, and that great benefits are obtained if the rooms

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are so constructed that they may be exposed to a sweep of outside air when the outdoor temperature will permit.

The rate of scald development is greatly influenced by temperature. Between 60 and 32 degrees, each drop of 10 degrees results in a delay of from three to six weeks in the time of the appearance of the disease. The optimum temperature for its occurrence is 60 degrees or slightly above. Temperatures of 75 and 85 degrees have prevented the development of the disease, but of course cannot be used as storage

temperatures. High humidities tend to increase scald, but the disease does not occur in saturated air that is kept stirred and does occur in dry stagnant air. The disease is not due to accumulation of carbon dioxide, this gas tending to decrease rather than increase the trouble.

Without going into any involved technical discussion of the manner in which scald develops, it may be said that the disease results from the action of accumulated respiration products, which in the absence of good ventilation are held in close contact with the skin of the apple, preventing normal respiration of the fruit and probably exercising as well a direct toxic effect on the skin. This action is a slowly cumulative one, which explains why apples do not scald until after they have undergone a period of storage and prolonged exposure to the gradually accumulating respiration gases. To provide a long storage life for our apples we must unquestionably hold them at as low a temperature as possible, but to secure their ultimate freedom from scald and their ultimate marketable condition we must at the same time provide good ventilation for the storage rooms. We may summarize scald prevention measures, then, as follows:

(1) Pick When Mature:

Pick when the ground color begins to lighten. Make more than one picking when practicable.

(2) Keep Cool:

In the Orchard—Keep the picked apples as cool as possible. Low temperatures are desirable, but all cooling is valuable. Keep the apples in the shade.

In Storage—Get apples to cold storage or air-cooled storage as soon as possible after picking. Use open crates—they cool more quickly than tight ones.

In Transit—Precool the fruit and ship in iced refrigerator cars if the weather is warm.

(3) Ventilate:

In the Orchard—In case of delay keep the fruit in open crates. Do not hold in large close piles. Give packing sheds and temporary storehouses plenty of air, *especially night air*.

In Storage—Hold in open crates if practicable, and stack to permit air circulation. Apples scald less in well ventilated cellars and air-cooled storage houses than in unventilated commercial cold storage plants, but the higher temperatures of the former are, of course, undesirable.

In Transit—Give the apples as much air as practicable. If the weather is cool ship "under ventilation." Delay of poorly cooled fruit in tight cars greatly increases scald and causes heavy losses.

The reputation and the sale of the Northwestern apple is based primarily upon its attractive appearance and its keeping quality, points which are vitally affected by storage diseases. There should therefore be intelligent attention devoted to these problems by all concerned with the growing and handling of apples.

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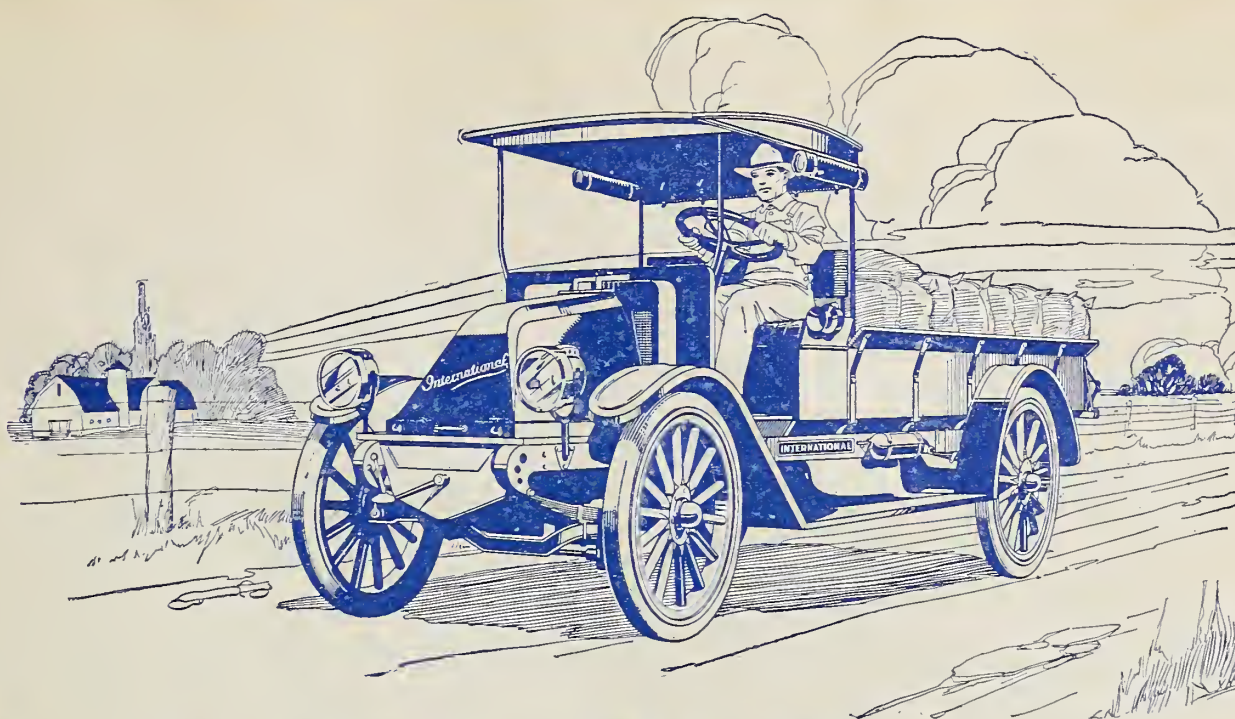
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